

DV717SI-2

DV723SI

DV721SI-2

service manual

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Chapter One About Maintenance

1.1 Safety precautions

1.1.1 Power supply

When maintenance personnel are repairing DVD players, he should pay special attention to the power board with 220V AC and 330V DC which will cause hurt and damage to persons!

1.1.2 Precautions for antistatic

Movement and friction will both bring static electricity which causes serious damages to integrated IC. Though static charge is little, when a limited quantity of electric charge is added to large-scale integrated IC, as the capacitance is very small in the meantime, now the integrated IC is very much easy to be struck through by static electricity or the performance will decrease. Thus static electricity prevention is of extraordinary importance. The following are several measures to prevent static electricity:

1. Use a piece of electric conduction metal with the length of about 2 metres to insert into the earth, and Fetch the lead wire from the top of the surplus metal and connect to the required static electricity device. The length and depth of the metal embedded under the earth should be determined according to the wettability of the local soil. For humid places, it may be shorter, and longer and deeper for dry places. If possible, it can be distributed and layed in terms of “#” shape.
2. On operating table-board, the antistatic table cushion should be covered and grounded.
3. All devices and equipments should be placed on the antistatic table cushion and grounded.
4. Maintenance personnel should wear antistatic wrist ring which should be grounded.
5. Places around the operating position should also be covered with electric conduction cushion or Painted with antistatic paint.

1.1.3 Precautions for laser head

1. Do not stare at laser head directly, for laser emission will occur when laser head is working, which will Hurt your eyes!
2. Do not use wiping water or alcohol to clean laser head, and you may use cotton swab.

1.1.4 About placement position

1. Never place DVD player in positions with high temperature and humidity.
2. Avoid placing near high magnetic fields, such as loudspeaker or magnet.
3. Positions for placement should be stable and secure.

1.2 Maintenance method

1.2.1 Visualized method

Directly view whether abnormalities of collision, lack of element, joint welding, shedding welding, rosin joint, copper foil turning up, lead wire disconnection and elements burning up among pins of elements appear. Check power supply of the machine and then use hands to touch the casing of part of elements and check whether they are hot to judge the trouble spot. You should pay more attention when using this method to check in high voltage parts.

1.2.2 Electric resistance method

Set the multimeter in resistance position and test whether the numerical value of resistance of each point in the circuit has difference from the normal value to judge the trouble spot. But in the circuit the tested numerical value of resistance is not accurate, and the tested numerical value of integrated IC's pins can only be used for reference, so the elements should be broken down for test.

1.2.3 Voltage method

Voltage method is relatively convenient, quick and accurate. Set the multimeter in voltage position and test power supply voltage of the player and voltage of a certain point to judge the trouble spot according to the tested voltage variation.

1.2.4 Current method

Set the multimeter in current position and test current of the player of a certain point to judge the trouble spot. But when testing in current method, the multimeter should be series connected in the circuit, which makes this method too trivial and troublesome, so it is less frequently used in reality.

1.2.5 Cutting method

Cutting method should be combined with electric resistance method and voltage method to use. This method is mainly used in phenomena of short circuit and current leakage of the circuit. When cutting the input terminal voltage of a certain level, if voltage of the player rises again, it means that the trouble lies in this level.

1.2.6 Element substitution method

When some elements cannot be judged good or bad, substitution method may be adopted directly.

1.2.7 Comparison method

A same good PC board is usually used to test the correct voltage and waveform. Compared these data with those tested through fault PC board, the cause of troubles may be found.

Through the above maintenance method, theoretical knowledge and maintenance experience, all difficulties and troubles will be readily solved.

1.3 Required device for maintenance

- ◆ Digital oscillograph ($\geq 100\text{MHz}$)
- ◆ TV set
- ◆ SMD rework station
- ◆ Multimeter
- ◆ Soldering iron
- ◆ Pointed-nose pincers
- ◆ Cutting nippers
- ◆ Forceps
- ◆ Electric screw driver
- ◆ Terminal connecting cord
- ◆ Headphone
- ◆ Microphone

Chapter Two

Functions and Operation Instructions

2.1 Features

This player has employed the new generation DV decode chip with built-in Dolby Digital decoder which will bring you to a brand-new AV entertainment world. The 2-laser super error-correction mechanism supports CD-R.

Brand-new AVEffects

#Compatible with DivX, MPEG4 discs to produce wonderful pictures.

#108MHz/12bit video DAC, with more vivid and brilliant pictures.

#Progressive-scan video outputs to eliminate the flickers hardly overcome by interlacing scan and therefore your eyesight will be well-protected. At the same time, the pictures definition is sharply enhanced and the pictures will be finer, smoother and stabler

#Brightness, chroma and contrast adjustment functions to render your eyes more comfortable.

#Digital echo Karaoke to enable your singing easier.

#Composite Video, S-Video and Component Video outputs.

#Built-In Dolby Digital decoder, separate 5.1Ch Outputs.

#Dolby output for 2channel(DOWNMIX).

#DVD-Audio decoding output to reproduce original and realistic sound effects.

High Quality Digital Audio

#Optical and coaxial outputs for Digital audio.

#DTS, Dolby Digital, PCM Digital audio outputs to satisfy the Fans'Ss acoustic requirements.

Many Convenient Features

#Screen saver protects your TV set carefully.

#The novel MP3 playback window GUI provides you a new way to appreciate Mp3 music.

#Multi-angle playback function makes it possible for you to view a scene from different camera angles.

#It's possible to select the desired beginning, development and ending of a story.

#Direct entry into desired scenes(title/chapter/track search).

#Zooming function to zoom up any playing picture.

#Capable of playing PAL/NTSC discs.

#Multiple aspect ratios to fit TV sets of various screen ratios.

#Parental lock function to prevent children from watching unsuitable discs.

#Multiple dubbing languages and subtitle languages bring you the best entertainment status all the time.

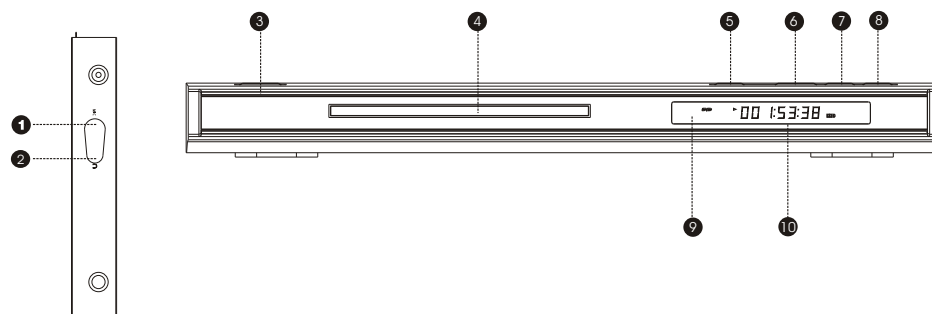
Super Compatibility with super VCD, VCD, CD, CD-R, MP3, HDCD, KODAK PICTURE CD etc.

NOTE: DivX version is still upgrading continuously and the latest version of this unit is DivX 5.1.

Some discs labelled with MPEG4 on the market actually are others, with which are incompatible. Please take care when buying discs.

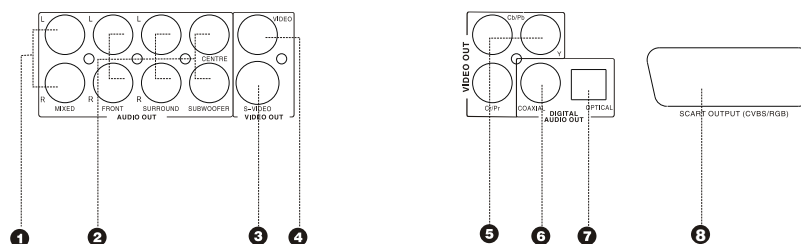
2.2 Control Button Locations and Explanations

2.2.1 Front Panel Illustration



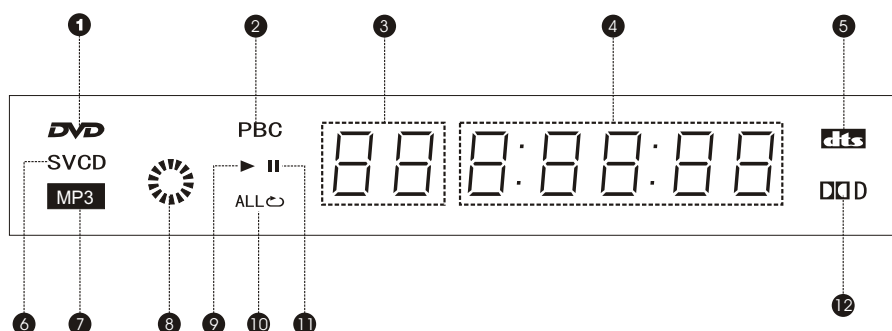
- | | |
|---------------------|-------------------|
| ① MIC jack | ⑥ PLAY button |
| ② Headphone jack | ⑦ PAUSE button |
| ③ POWER switch | ⑧ STOP button |
| ④ Disc tray | ⑨ IR SENSOR |
| ⑤ OPEN/CLOSE button | ⑩ Display windows |

2.2.2 Rear Panel Illustration



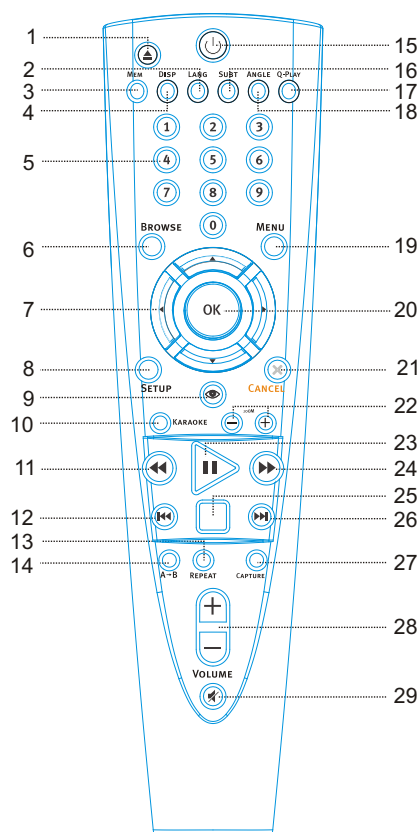
- | | |
|------------------------|-------------------------------------|
| ① Mixed Audio Out jack | ⑤ Video Component/Y Pb Pr Out jacks |
| ② 5.1CH Audio Outjacks | ⑥ Digital Audio Coaxial Out jack |
| ③ S-Video | ⑦ Digital Audio Optical Out jack |
| ④ Video Out jack | ⑧ SCART Outjack |

2.2.3 VFD Display Window Illustration



- | | | |
|--------------------|------------------------------|-----------------|
| ① DVD disc | ⑤ DTS | ⑨ PLAY |
| ② PBC | ⑥ VCD、CD、SVCD Disc | ⑩ Repeat |
| ③ Chapter or Track | ⑦ Mp3 Disc | ⑪ PAUSE |
| ④ Playback time | ⑧ Playback status indication | ⑫ DOLBY Digital |

2.2.4 Remote Control Illustration



- ②① OK Button
- ②② Cancel Button
- ②③ ZOOM +/-Button
Zoom in/out the displayed frame.
- ②④ [▶]Button
Play or pause playback.
- ②⑤ [⏮]Button
Fast forward play.
- ②⑥ [□]Button
Stop playback.
- ②⑦ [⏭]Button
Skip forward.
- ②⑧ CAPTURE Button
Set the played image as the power-on logo.
- ②⑨ VOL +/- Button
Increase/decrease volume level.
- ③① MUTE Button
Press once to mute, twice to turn off.

- ① [▲] Button
Open or close the disc tray.
- ② LANG Button
Change the audio language or audio channel.
- ③ MEMORY Button
Save the playing point or jump to the saved point .
- ④ DISP Button
Display or hide disc information.
- ⑤ NUMBER Buttons
- ⑥ BROWSE Buttons
switch new user interface.
- ⑦ CURSOR Buttons
- ⑧ SETUP Button
Function Setup.
- ⑨ [👁]Button
Open/close the virtual keyboard function.
- ⑩ KARAOKE Button
Karaoke operation menu.
- ⑪ [⏮] Button
Fast backward play.
- ⑫ [⏮] Button
Skip backward.
- ⑬ REPEAT Button
Repeat play.
- ⑭ A-B Button
Repeat the select.
- ⑮ [⏻]Button
Press once to stand by, Press twice to play.
- ⑯ SUBT Button
Change subtitle language, Switch JPEG display mode.
- ⑰ Q-PLAY Button
Skip the advertisement/warning and play the DVD directly.
- ⑱ ANGLE Button
Change camera angle .
- ⑲ MENU Button
Display DVD menu or open/close PBC.

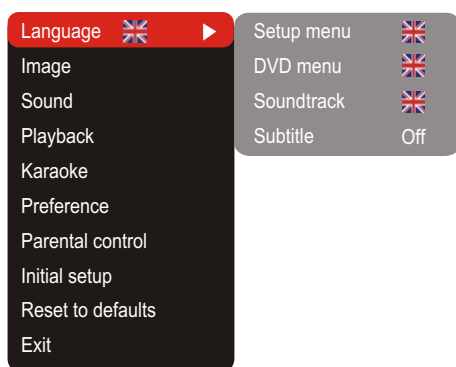
2.3 Accessories

AUDIO/VIDEO CORD	1PCS
REMOTE CONTROL	1PCS
AAA SIZE BATTERIES	2PCS
WARRANTY CARD	1PCS
USER MANUAL	1PCS
KARAOKE DISC	1PCS

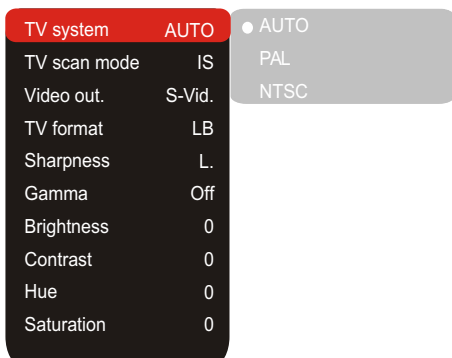
2.4 FUNCTION SETUP

2.4.1 Function Setup

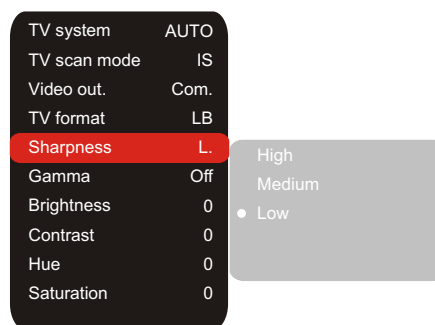
1. Press the [SETUP] button and the screen displays the selection menu of function setup.



2. Press the [CURSOR] button to select the menu to be entered and press the [OK] or button to confirm. Or press the [CURSOR] button to Exit item and then press the [OK] button to exit .
3. Press [UP/DOWN] arrow to select the desired item you want to set and press [OK].
For example, press [UP/DOWN] arrows to select IMAGE and press [OK]. The Image setting page appears on the screen.

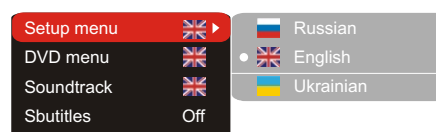


4. Press [UP/DOWN] arrow to select the SHARPNESS item. Press [OK] to confirm it. And then press [UP/DOWN] arrow to select the desired value. For example: Press [UP/DOWN] arrow to select "Medium", then press [OK], the TV screen display.



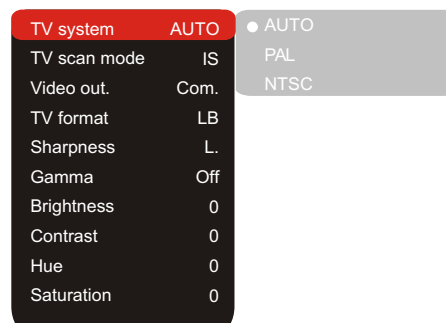
5. Press [LEFT] button if you want to return to the previous setup page.
6. Press [SETUP] to exit the setup menu.

2.4.2 Language



1. Setup menu: This item is used to set the prompts language on the screen.
#Optional setting: Russian, English, Ukrainian.
#Default: English.
2. DVD menu: To set the preference disc menu lang when playing.
#Optional setting: Russian, English, Estonian, Latvian, Kazakh, Romanian, Byelorussian, Ukrainian, Chinese, Others.
#Default: English.
3. Sountrack: To set the preference audio language when playing.
#Optional setting: Russian, English, Estonian, Latvian, Kazakh, Romanian, Byelorussian, Ukrainian, Chinese, Others.
#Default: English.
4. Subtitles: To set the preference subtitle language when playing.
#Optional setting: Off, Russian, English, Estonian, Latvian, Kazakh, Romanian, Byelorussian, Ukrainian, Chinese, Others.
#Default: Off.

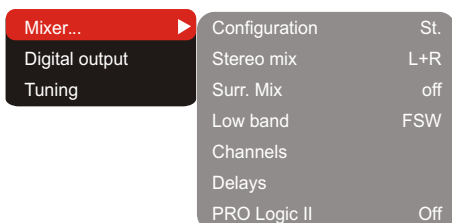
2.4.3 Image



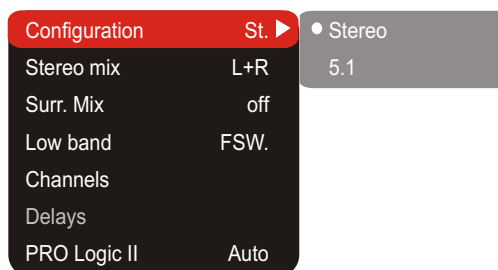
1. TV system: This item is used to the video output system of this unit.
#Optional setting: Auto, PAL, NTSC.
#Default: AUTO.
 2. TV scan mode: To set Progressive scan, Interlaced scan mode.
#Optional settings: Progressive , Interlaced.
#Default: Interlaced.
 3. Video output: To set the types of SCART out connector.
#Optional setting: S-Video, Component , SCART .
#Default: Component.
#When using RGB outputs from the SCART interface, please select RGB. Other wise , please select Com-ponent, and when using S-Video output please select S-Video.
 4. TV format: To set the aspect ratio of this player's output image.
#Optional setting: 4:3 Pan-scan, 16:9 letterb., 16:9 TV.
#Default: 16:9 letterb.
 5. Sharpness: Used to set the sharpness of video outputs.
#Optional setting: High, Medium, Low.
#Default: Medium.
 6. Gamma emendation: This item is used to setup the Gamma value of video output.
#Optional setting: High, Medium, Low, Off.
#Default: Off.
 7. Brightness: Used to set the brightness of video outputs.
 8. Contrast: Used to set the contrast of video outputs.
 9. Hue: Used to set the hue of video outputs.
 10. Saturation: Used to set the saturation of video outputs.
- #Brightness, contrast, hue and saturation adjusting means:

- A. Press [UP/DOWN] arrow in the video setup menu to select the desired item you want to adjust. Press [OK] or [RIGHT] button to enter the item's adjustment.
- B. Press [UP/DOWN] arrow to adjust the setting value.

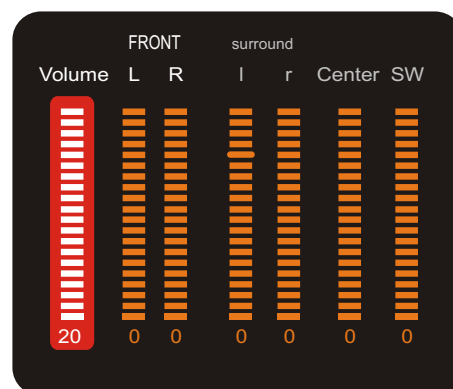
2.4.4 Sound



1. Mixer...

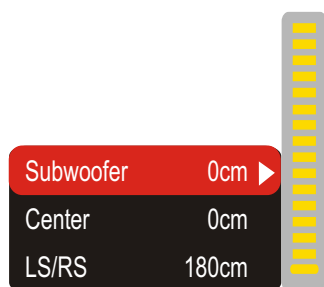


- A. Configuration: To set this player's DOWNMIX mode to change multi-channel audio into two channel audio.
#Optional setting: Stereo, 5.1.
#Default: Stereo.
- B. Stereo mix: To set the output means of the left or right audio when playing a Dolby disc with separate two-channel audio.
#Optional setting: L+R, L, R.
#Default: L+R.
- C. Surr. Mix: To set output means of the surround left and right audio when playing a stereo disc.
#Optional setting: Off, sum, Virt. Surr.
#Default: Off.
- D. Low band: select the channel that you desire to output low frequency signal.
#Optional setting: Front F, Center C, Surround Sr, Subwoofer SW.
#Default: Front F, Subwoofer SW.
- E. Channels: To set volume of each individual channel.
 - a. Press [UP/DOWN] navigation keys to select CHANNEL TRIM, then press the [OK] or [RIGHT] navigation key to select ENTER SETUP PAGE as shown in the TV screen:



- b. Press [LEFT/RIGHT] navigation keys to select the desired channel to adjust.
- c. Press [UP/DOWN] navigation keys to raise or lower volume of the channel.

- D. Press [OK] or [LEFT] to return to the Mix.. setup page.
- F. Delays: To set delay time of the Center/ Surround/ Subwoofer Speaker.
- a. Press [UP/DOWN] navigation keys to select Delays in Channels item, then press [OK] or [RIGHT] navigation key select ENTER SETUP PAGE as shown in the TV screen.



- b. Press [UP/DOWN] navigation keys to Select the desired item oup Press [OK] or [RIGHT] button to enter setting.
- c. Press [UP/DOWN] navigation keys to raise or lower volume.
- d. Press [OK] or [LEFT] to return to the Delays in channels setting page.
- G. PRO Logic II: To set PRO Logic II to ON or OFF. If the TITLE does not support this function, we recommend that you set this item to AUTO because it would become worse if the processing effects were added forcibly.

#Optional setting: Auto, On, Off.

#Default: Auto.

2. Digital output: select to set the format and stream form of digital audio output.

A. SPDIF format:

#Optional setting: RAW format, SPDIF/PCM.

#Default: RAW format.

B. LPCM

#Optional setting: 48 kHz 16 bit, 96 kHz 24 bit, 192kHz24bit.

#Default: 48 kHz 16 bit.

3. Tuning:

A. Max volume: set the maximum volume limit.

B. Equalizer: To set Equalizer modes.

#Optional setting: Off, Rock, Pop, Live, Dance, Techno, Classic, Soft.

#Default: Off.

C. Echo: To set different sound field effects.

#Optional setting: Off, Concert, Living room, Hall, Bathroom, Cave, Arena, Church.

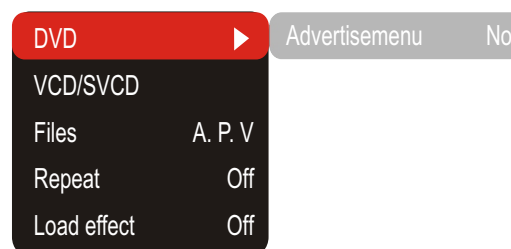
#Default: Off.

D. Tone balance: to set the tone level to match your diapason when you're singing

#Method to adjust tone control:

- a. Press [UP/ DOWN] cursor buttons to select "tone" item in Audio Setting page, and then press [OK] or [RIGHT] button to enter Adjustment Menu.
- b. Press [UP/DOWN] cursor button to adjust setting value.
- C. Press [OK] or [LEFT] button to return to Audio Setting page after adjustments are done.

2.4.5 Playback



1. DVD: set whether information of advertisement and warnings at the beginning of DVD disc is skipped to play the movie directly.

Always skip ads

#Optional setting: Yes, NO

#Default: Number

2. VCD/SVCD: To set the PBC status.

#When playing Super VCD or VCD2.0 discs, if the PBC is ON, the menu image displays.

#Optional setting: On, Off.

#Default: On

3. Files: data disc may probably includes Mp3, JPEG and MPEG4 format files in which you may select DVD player to read the file type.

#Optional setting: Audio, Picture, Video.

#Default: Audio, Picture, Video.

4. Repeat : select the repeat playback mode.

#Optional setting: Off, Single, all.

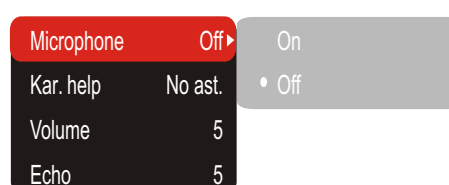
#Default: Off.

5. Load effect: set the may to play JPEG image.

#Optional setting: Off, from top, from bottom.

#Default: Off.

2.4.6 Karaoke



1. Microphone: switch on or off microphone.

#Optional setting: On, Off.

#Default: Off.

2. Kar. help: select accompany singing means.

#Optional setting: Channels L, Channels R,
Channels No ast, Channels No voc.

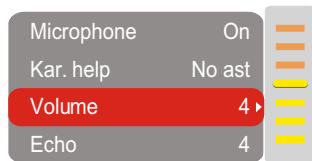
#Default: Channels No ast.

3. Volume:

A. In microphone setup page, press [UP/DOWN] cursor to select "Volume" item, and then press [OK] button to enter the adjustment menu.

B. Press [UP/DOWN] cursor to adjust the setup value.

C. After adjustment finishes, press [OK] button to return to microphone setup page.



4. Echo:

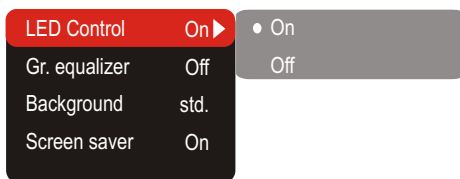
A. In microphone setup page, press [UP/DOWN] cursor to select "Echo" item, and then press [OK] button to enter the adjustment menu.

B. Press [UP/DOWN] cursor to adjust the setup value.

C. After the adjustment finishes, press [OK] button to return to microphone setup page.



2.4.7 Preference



1.LED Control:This item is used set color of led on the front panel.

#Optional setting: On, Off.

#Default: On.

2.Gr. equalizer: This item is used to set wether the Dynamic Spectrum is allowed.

#Optional setting: On, Off.

#Default: Off.

#Dynamic Spectrum display is invalid in Data Disc、 DVD AUDIO playback.

3.Background: This item is used ti setup the sort of Power-in Logo.

#Optional setting: Standard, saved.

#Default: Standard.

NOTE

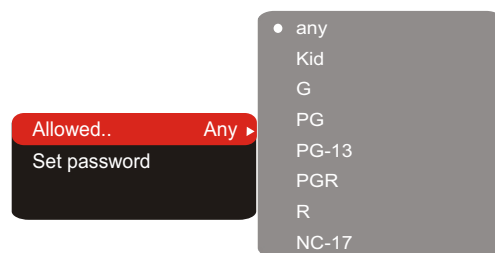
The Screen Logo refers that use the image selected by pressing the [CAPTURE] button as the power-on logo. When in the operation of changing screen, if the power-on logo has not set in Screen Logo, the unit will automatically set the power-on logo as Screen Logo.

4.Screen saver: Open or close the screen saver function.

#Optional setting: On, Off.

#Default: On.

2.4.8 Parental control



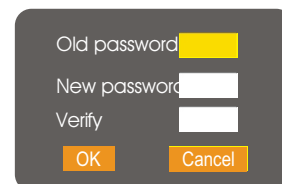
1.Allowed..: To set the parental control ratings to prevent children from watching the restricted contents.(In case the disc supports this function.)

#Optional setting: any, Kid, G, PG, PG-13, PGR, R ,NC-17.

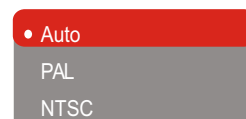
#Default: any.

2. Set password: To set four digit password to enable you to change the parental control ratings.

#Default: 7890.



2.4.9 Initial setup

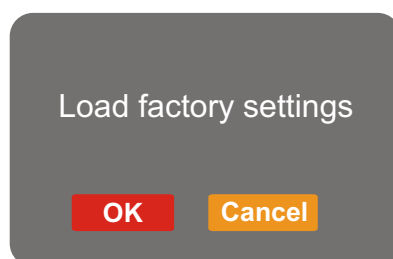


Press [UP/DOWN] arrow to select the desired option and Press [OK] button to confirm it.

NOTE

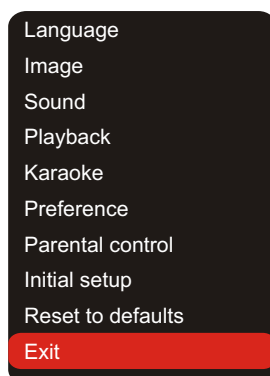
In this setup state, you may not press [LEFT] button to return to the previous menu.

2.4.10 Rest to defaults



Reset to defaults: To restore all settings to the default value except for the parental control and password settings.

2.4.11 Exit



Press [UP/DOWN] arrow to select the Exit item. Press [OK] button to exit the setup menu.

2.5 Specifications

Playable discs	DVD-Video, Super VCD, VCD, DivX 3.11, DivX 4,DivX 5, Divx Pro, XviD, CD-DA, CD+G, HDCD, MP3, WMA, Kodak Picture, JPEG		
Input	MIC input		
Output	Audio outputs	Analog audio output: Digital audio output:	Stereo, output 5.1CH Coaxial, Optical
	Video outputs	Composite, S-Video, component Y Cb Cr, progressive scan output Y Pb Pr, RGB/SCART	
	Headphones output		
Video Characteristics	Video amplitude	1.0Vp-p(75 Ω)	
	S-Video amplitude	Y:1.0Vp-p(75 Ω), C:0.286Vp-p(75 Ω)	
	Component Video amplitude	Y:1.0Vp-p(75 Ω), Cb/Cr:0.7Vp-p(75 Ω)	
Audio characteristions	Frequency response	20~20KHz(±1 dB)	
	Signal-to-noise ratio	>100(dB)	
	THD	<0.01%	
Operating voltage	~110-250V, 50/60Hz		
Power consumption	14W		
General Specifications	Dimensions:	380mm×258mm×41.5mm	
	Mass:	2kg	

Operating Temperature	5~35℃
Operating Humidity	15~75%(no condensation)

#Design and specifications are subject to change without notice.

#We do not guarantee that all discs can be played smoothly due to the disc quality, disc recording quality and recording format.

Chapter Three Principle and Servicing

Section One Principle of the Player

3.1.1 Block diagram of the player

DV717SI-2 is composed of decode circuit, servo circuit, audio circuit, video circuit, MIC circuit and power circuit. Block diagram of the player is shown in the figure 3.1.1.1:

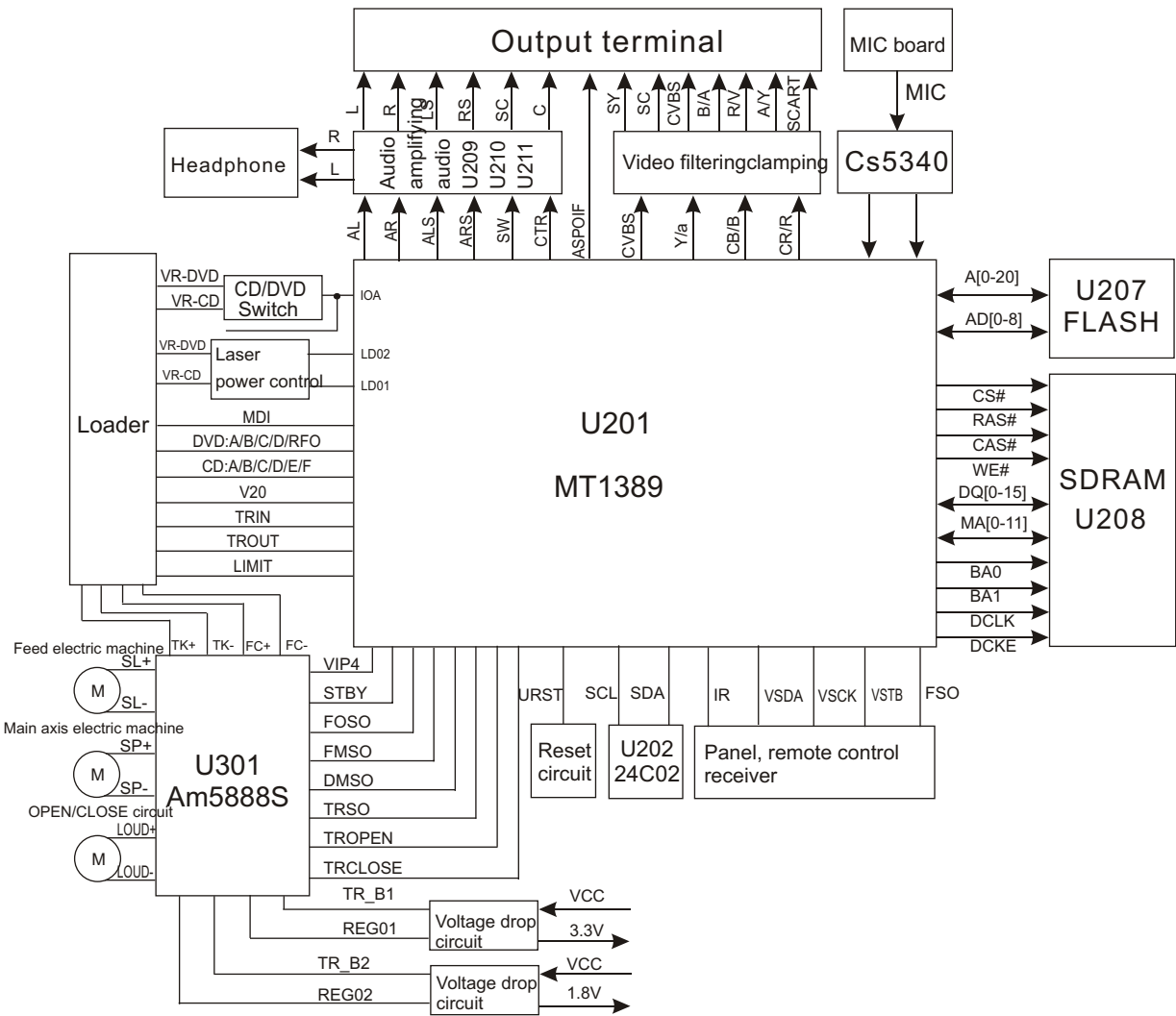


Figure 3.1.1.1 Block diagram of the player

3.1.2 PCB board composition diagram of the player

PCB board composition diagram of the player is shown in the figure 3.1.2.1:

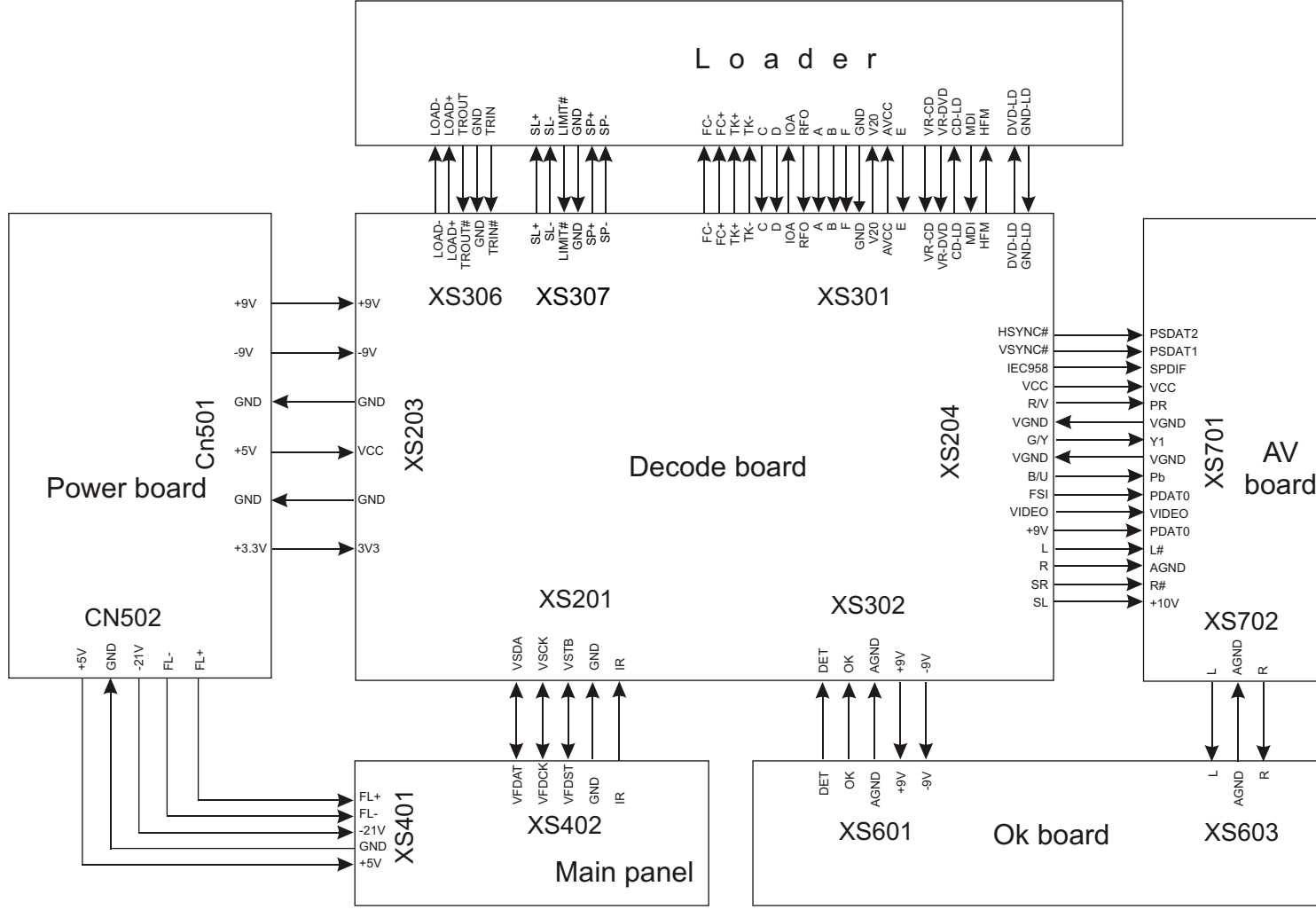


Figure 3.1.2.1 PCB board composition diagram of the player

3.1.3 Introduction to IC of the player

Introduction to IC of the player is shown as in the following table:

PCB semi-finished product	IC model	Location	Function
Decode board 2985-2	MT1389HD	U201	Decode chip
	24C02	U202	EEPROM
	CS5340	U203	A/D conversion
	29LV160BE	U207	FLASH
	HY57V641620HGT-7	U208	SDRAM
	4580	U209,U210,U211	Operational amplifier (audio amplifying)
	AM5888S	U302	Servo drive
Main panel 4973-2	V6312A	U401	Panel control IC
	HS0038B3V	U403	Remote control receiver
Power board 5985-1	VIPER22	U501	Power switch IC
	HS817	U502	Photoelectric coupler
	LM431A	U503	Precision voltage stabilizer
OK board 6717-0	KA4558	U601	Operational amplifier (MIC amplifying)
	TDA1308	U603	Headphone amplifying

Section Two Unit Circuit Principle

3.2.1 Laser head circuit

1. Laser head flat cable function introduction is shown in the following table:

Pn	Name	Signal flow direction	DVD disc	CD disc	No disc	Function description
1	F-	Input loader	2.52	2.34	0.46	Focus error signal is added to two sides of pick-up focus coil
2	F+	Input loader	2.49	2.49	0.93	
3	T+	Input loader	2.53	2.51	0.94	Trace error signal is added to two sides of pick-up trace coil
4	T-	Input loader	2.58	2.51	0.93	
5	C	Input MT1389	2.2	2.25	2.04	Disc data signal
6	D	Input MT1389	2.2	3.2	2.04	Disc data signal
7	IOA	Input MT1389	0.01	3.2	3.21	Disc identification signal, CD is 3.3V, DVD is 0V
8	RF	Input MT1389	2.21	2.53	1.28	The sum of disc data signal
9	A	Input MT1389	2.17	2.22	2.04	Disc data signal
10	B	Input MT1389	2.19	2.27	2.04	Disc data signal
11	F	Input MT1389	2.07	2.44	2.03	Supplementary signal used in trace
12	GND	Ground	0.01	0.01	0	Grounding
13	V20	Input loader	2.04	2.06	2.03	Reference voltage
14	Vcc	Input loader	5.04	5.04	5.02	Supply voltage for loader
15	E	Input MT1389	2.06	2.45	2.03	Disc data signal
16	Blanking	blanking in air	0.01	0	0	unused
17	VR-CD	Input loader	0.21	0.01	0	Through the handling inside loader, make sure MD11 is 180mV when reading CD
18	VR-DVD	Input loader	0.01	0.2	0	Through the handling inside loader, make sure MD11 is 180mV when reading DVD
19	LD-CD	Input loader	0.09	2.1	0	CD laser power control signal

20	MDII	Input MT1389	0.21	0.2	0	CD and DVD laser power monitoring signal
21	HFM	Input loader	5.04	5.04	5.02	High frequency overlapping signal produces laser with different wave length inside loader
22	Blanking	unused	0.01	0.1	0	
23	LD-DVD	Input loader	2.21	0.1	0	DVD laser power control signal
24	GND	unused	0.01	0.01	0	Grounding

Note: 1. When reading DVD, there are only A, B, C, D signals.

2. When reading CD, there are A, B, C, D, E, F signals.

3. $RFO=A+B+C+D$.

4. Focus error signal= $(A+C)-(B+D)$ Trace error signal= $E-F$.

2. Working principle

(1) Laser tube: loader DVD laser diode wave length is 650nm and that of CD laser diode is 790nm; if wave length is between 370nm and 750nm is visible light, laser during the course of reading DVD disc is visible light and that if IR light when reading CD disc.

(2) Principle of laser head pick-up signal: laser beam projects onto disc vertically. When focus of laser beam projects into disc, laser beam will produce reflection and reach light detect device through reflection loop and switch into electric signals through photo-electric conversion. The reflection loop produced in non-pit information area and pin information area on discs are different and reflect into different areas of light detect device, the photo-electric diode in different positions of light detect device will produce different signals to process light detect device diode signals and then produce digital signals.

(3) Focus and trace winding: when laser head is reading signals normally, information side should be in the focus of laser beam. Because of disc error and some factors, such as high speed rotation and mechanical error, laser beam will deviate from information side unavoidably to produce phenomena of deflection and de-focusing; focus and trace coil are added to adjust laser beam to make it focus in information area correctly.

(4) RF signal formation: when reading disc normally, light detect device will have 160MV vague eye-shape waveform that are superposed on A, B, C, D, through being superposed by adder inside light detect device, output RF signals from RFO pin; frequency when reading DVD disc is far higher than that when reading CD disc and output range is about 1.4V.

3.2.2 Servo circuit

1. Servo system of this player adopts SANYO 65 loader and MTK decode solution (MT1389HD+FLASH (16M) +SDRAM (64M)), and its servo circuit is mainly composed of front end signal processing, digital signal processing and digital servo processing, digital signal processing IC MT1389E and drive circuit Am58888, in which Mt1389 is also the main part of decode circuit. Servo circuit block diagram is shown in the figure 3.2.2.1:

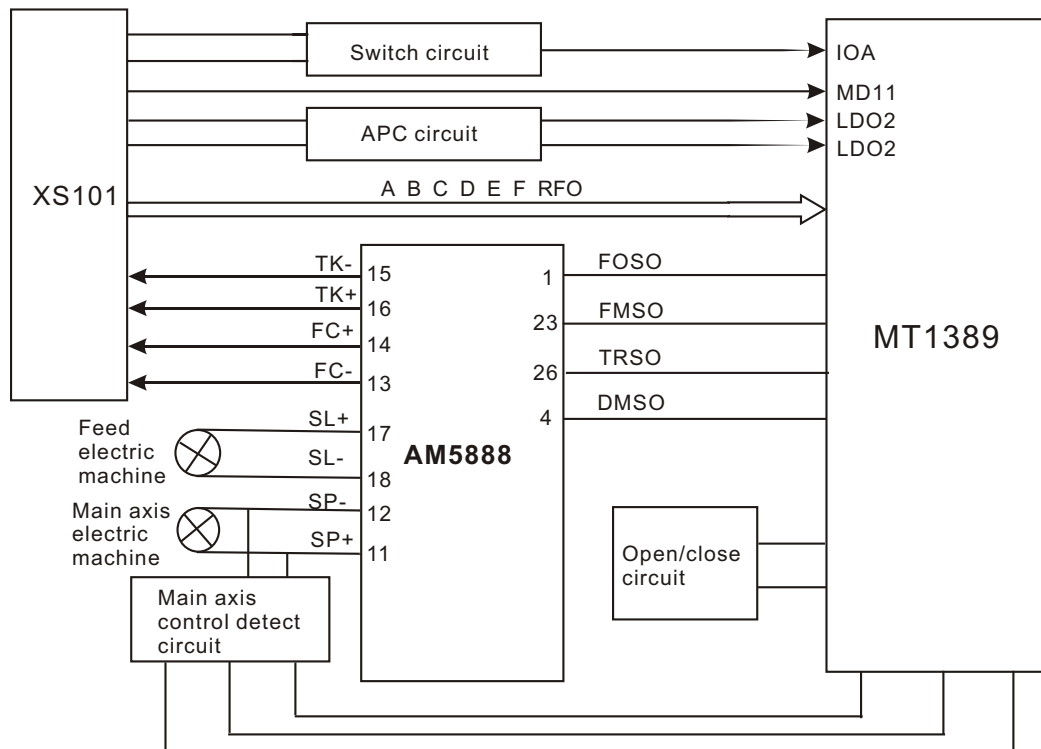


Figure 3.2.2.1 Servo circuit block diagram

2. Working principle: after power on or close to proper position (on loader frame for normal DVD, as for PDVD, on PCB at the lower part of door), loader laser head begins to reset; after laser head reaches proper position, detect switch will give a signal to Mt1389, Mt1389 begins to output focus, main axis and light emission signals, machine begins to rotate, laser head begins to identify disc information and decide whether disc is CD or DVD according to disc information to facilitate to output level from IOA pin to make disc switch circuit and laser head PD IC make the relevant control action. At the same time, Mt1389 adjusts laser output power through laser power control circuit.

After loader reading disc information, A, B, C, D, E, F signals are formed through photo-electric conversion and sent out to Mt1389 (DVD only has A, B, C, D signals), and then inputted from pin 2~11, 18, 19 of MT1389. After being amplified and processed by the pre-amplifier inside MT1389, now signals are separated to two parts for processing inside Mt1389. One part, through addition inside Mt1389 and amplifying and subtraction circuit, produces servo error signal, after being processed by digital servo

Signal circuit, corresponding servo control signals form to output FOO, TRO, DMO, FMO digital servo Control signals from pin 42, pin 41, pin 37, pin 38 of Mt1389 respectively, and FOSO, TRSO, DMSO, FMSO, through integration circuit composed by resistor capacitor, and send to servo driver circuit for amplification to bring along focus winding, trace winding, main axis electric machine and feed electric machine after drive amplification. Among these, focus and trace servo are used to correct objective position accurately; feed servo is used to bring along laser head to make radial large-scale move which belongs to the preliminary adjustment to laser head position; and main axis servo is used to control main axis electric machine to make it read signals in means of constant linear velocity and bring along disc to rotate. After processing of amplification by VGA voltage control amplifier and equalization frequency compensation inside MT1389, another part of signals are changed into digital signals through internal A/D converter. When loader is reading CD/VCD signals, these signals are conducted EFM demodulation inside MT1389, and then outputted to latter stage for AV decoding after finishing CIRC (Cross-Interleaved Reed-Solomon Code) error correction inside. When loader is reading DVD signals, these signals are conducted ESM demodulation inside MT1389, and then sent to latter stage for decoding after finishing RSPC error correction inside. Normal DVD player has a open/close circuit to control the in and out of door to reach the purpose of conveying discs; PDVD adopts manual open means and whether it is close to proper position can be checked by detect switch.

3. Explanation to servo terms

(1) FOO: when rotating, disc may probably move upwards or downwards slightly to make the focus of laser emitted by laser head cannot justly fall on data pit of disc, so laser head is required to move upwards or downwards to make focus aim at data pit justly. When laser head is moving upwards or downwards, it means that pick-up is making focus acts.

(2) TRO: data information is saved in disc in form of tracks. When disc is rotating, trace deviation will produce and now laser head is required to be adjusted. In this process, it is objective, but the entire pick-up, that moves forwards or backwards, and the moving range is very small.

(3) FMO: similar to acts of trace, the acts of feed are larger than those of trace. Feed conducts a large scale movement firstly, and then trace moves slightly in this range. Feed moves for a while, and does not move for another while; but trace moves all the time. Feed is rough adjustment and trace is fine and acts are obvious when power on and selecting tracks.

(4) DMO: it is the top that holds up disc. Its rotation speed decides that of disc. Its rotation is generated by an individual DC electric machine, in which rotation speed of DVD is twice over that of CD.

3.2.3 Laser power control circuit

1. Laser power control circuit is shown in the figure 3.2.3.1:

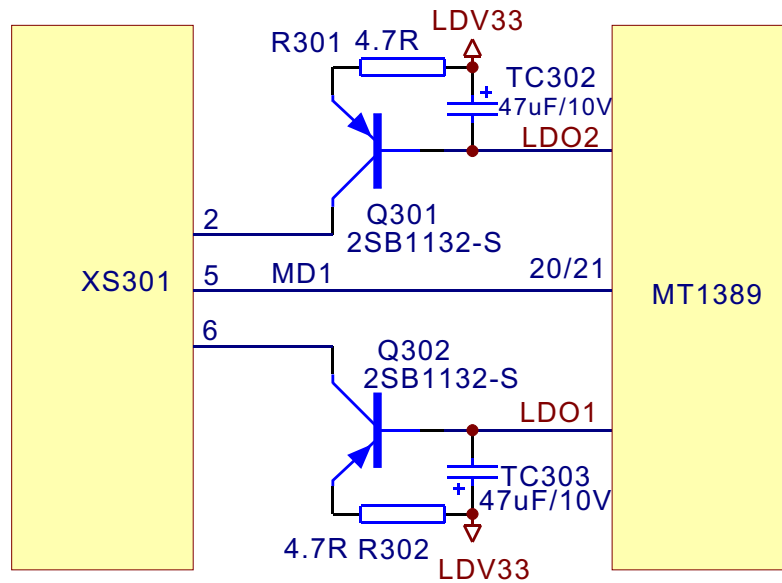


Figure 3.2.3.1 Laser power control circuit diagram

2. Working principle

Pin 20/21 of Mt1389 is laser power detect input pin, pin 21 is DVD laser power strong/weak detect signal input pin, pin 23 is VCD laser power drive control output pin and pin 22 is DVD laser power drive control output pin.

When reading VCD discs, laser power becomes weak, voltage of MDI pin decreases, voltage of pin 23 of Mt1389 decrease to make voltage of pin 19 of Xs301 increase to reach the purpose of promoting laser power. When laser power is too strong, voltage of MDII pin increases to make voltage of pin 23 of Mt1389 increase to make voltage of pin 19 of Xs301 decrease to reach the purpose of reducing laser power to form an auto power control circuit.

When reading DVD disc, pin 21 is detect signal input pin, pin 22 is drive control output pin and working principle is the same with that when playing VCD disc.

3. Key point voltage (unit: V) is shown as the following table:

Location	Read DVD disc	Read VCD disc	Location	Read DVD disc	Read VCD disc
V103_E	2.9V	3.2V	V104_B	3.2V	2.2V
V103_B	2.2V	3.2V	V104_E	3.2V	2.9V
V103_C	2.2V	0	MT1389_20	0.2V	0.2V
V104_C	0	2.2V			

3.2.4 CD/DVD switch circuit

1. CD/DVD switch circuit is shown in the figure 3.2.4.1:

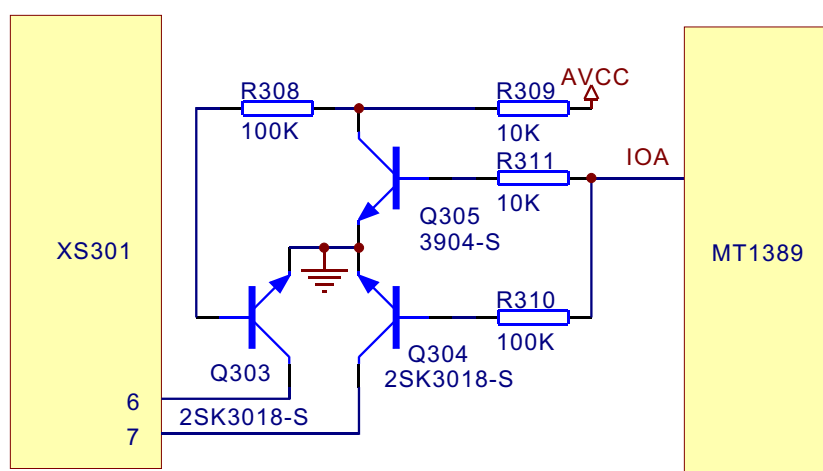


Figure 3.2.4.1 CD/DVD switch circuit diagram

2. Working principle: after loading disc into the machine, IOA end of ,Mt1389 is defaulted high level to make Q305 saturated on and form loop with CD laser power control circuit on loader. At the same time, IOA directly reaches loader PD IC for switch and disc begins to rotate. When servo processing system identifies that disc in machine is not CD, IQA pin outputs low level to make Q305 cut off, Q303 is on and forms loop with DVD laser power control circuit on loader to perform the action of reading DVD disc. After disc tray opens, IOA still keeps the state before opening disc. If the machine cannot identify which disc is in this machine, IQA pin will switch continuously until disc has been read or system judges that there is no disc in.

Note: Q303, Q304 are MOS pipe

3. Key point voltage (unit: V) is shown in the following table:

State	Q305			Q303		
	Base electrode B	Collector C	Emitter E	Grid electrode G	Drain electrode D	Source electrode S
DVD disc	0	3.86	0	3.81	0.18	0
VCD disc	0.64	0.1	0	0	0	0
State	Q304			IOA		
	G	D	S			
DVD disc	0	0	0	0		
VCD disc	3.27	0.18	0	3.3		

3.2.5 Open/close door drive circuit

1. Open/close door drive circuit is shown in the following figure 3.2.5.1:

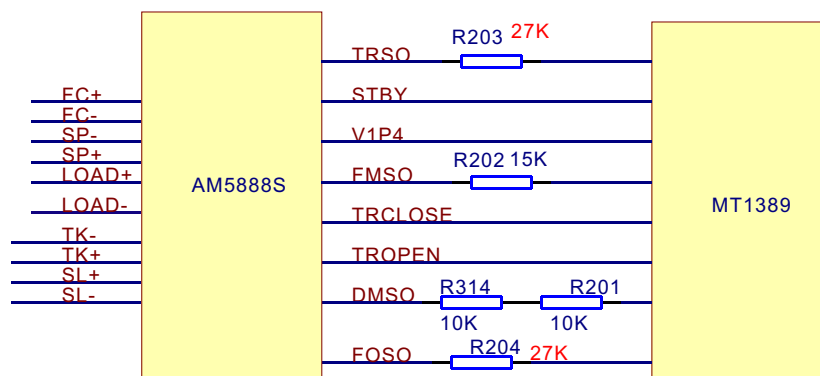


Figure 3.2.5.1 Open/close door drive circuit diagram

2. Working principle: when machine is reading discs normally, pin 6, 7, 9 of AM5888S are all 0V. After pressing OPEN button, pin 6 inputs high level, pin 10 LOAD+ outputs high level, electric machine rotates in positive direction and performs action of opening door. When closing door, pin 7 inputs high level, pin 9 LOAD- outputs high level and forms loop through electric machine, which reverses to carry out action of closing door. After closing to proper position, all pins are low level. Servo drive principle is the same with the drive of D5954 solution, so we will not repeat here.

3. Key point voltage (unit: V) is shown in the following table:

State	Q306			Q307		
	Base electrode B	Collector C	Emittor E	Base electrode B	Collector C	Emittor E
Read disc	5.06	5	5.06	5.01	5.03	5.06
Open disc tray to proper position	4.79	4.77	5.06	4.77	4.79	5.06
Open disc tray	4.74→5.05→4.74	4.76→0.2→4.76	5.06	4.76→4.33→4.76	4.76→5.02→4.76	5.06
Close disc tray	4.74→4.33→4.74	4.76→5.05→4.76	5.06	4.76→5.03→4.76	4.79→0.2→4.79	5.06
State	Q308			Q309		
	Base electrode B	Collector C	Emittor E	Base electrode B	Collector C	Emittor E
Read disc	0	5	0	0	5.03	0
Open disc tray to proper position	0	4.77	0	0	4.79	0
Open disc tray	0→0.93→0	4.76→0.2→4.76	0	0	4.79→5.02→4.79	0
Close disc tray	0	4.76→5.05→4.76	0	0→0.93→0	4.79→0.2→4.79	0

State	Q310			OUT	IN
	Base electrode B	Collector C	Emittor E		
Read disc	0	0	0	0	0
Open disc tray to proper position	0	0	0	0	0
Open disc tray	0→0.63→0	0	0	0→3.12→0	0
Close disc tray	0	0→0.93→0	0	0	0→3.12→0

3.2.6 Main axis control circuit

1. Main axis control circuit is shown in the figure 3.2.6.1:

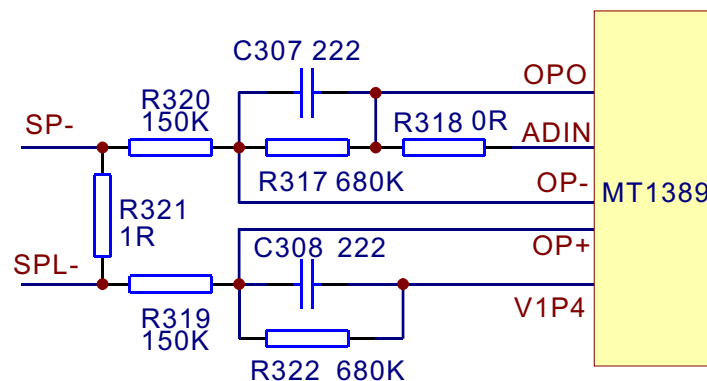


Figure 3.2.6.1 Main axis control circuit diagram

2. Function: disc is always in high speed rotation state when machine is reading discs, when it is necessary to open door and change another disc, MT1389 stops giving positive phase drive signals to main axis drive circuit, but disc is still rotating due to the function of inertia. If the action of opening door is carried out at this moment, disc will be worn, so the machine must apply brake to main axis. Whether disc has stopped rotating or whether it is rotating reversely, decode chip cannot judge, so a main axis control circuit is added to make decode chip can effectively monitor whether disc has stopped rotating.

3. Working principle: MT1389 has a built-in comparator composed of operational amplifier, in which OP+ is the in-phase input end, OP- is reverse input end, OPO is output end. When playing normally, electric machine is rotating in positive direction, voltage of OP+ is higher than OP-, voltage of OPO is more than 1.4V. When it is necessary to open disc door, main brake signals stop, electric machine is eternal magnet, so when rotating, inductive electromotive force produces on two ends, through R320, R319 sampling, to give to decode chip to make OPO output voltage lower than 1.4V and transmit to MT1389 ADIN input pin through R318; when ADIN is high level, main axis does not make any acts, when

ADIN is low level, MT1389 outputs an instant electric machine reverse braking signal to make main axis electric machine speed down, and such cycling goes on until main axis stops rotating. PDVD is manual means for door opening, so disc is still rotating after disc door opening but will stop soon.

4. Key point voltage (unit: V) is shown in the following table:

Key point	Position	Normal working voltage (V)	Volateg change w hen disc out (V)
SP+	Pn 11 of AM5888S, pn 5 of XS307	3.79	3.79→0.70→1.80
SP-	Pn 12 of AM5888S, pn 6 of XS307	1.38	1.38→3.40→1.80
OP+	Pn 36 of MT1389	1.38	1.38→3.10→1.80
OP-	Pn 35 of MT1389	1.53	1.53→3.08→1.98
OPO	Pn 34 of MT1389	2.44	2.44→0.40→2.50
ADIN	Pn 47 of MT1389	2.44	2.41→0.41→2.44
DMSO	Pn 4 of AM5888S	1.42	1.42
VIP4	Pn 30 of MT1389	1.41	1.41

3.2.7 Decode circuit

1. Decode circuit block diagram is shown in the figure 3.2.7.1:

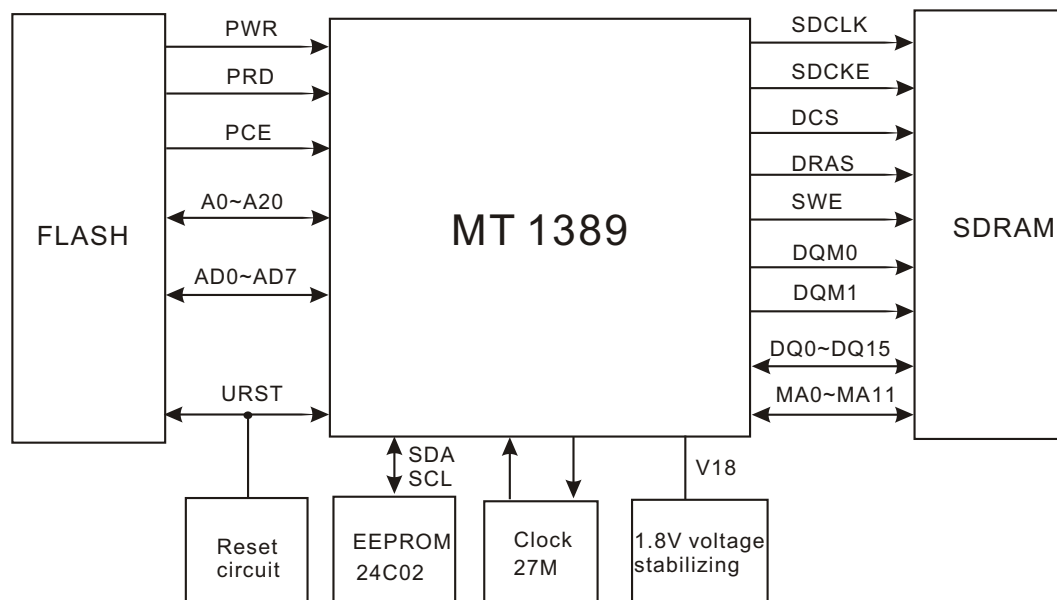


Figure 3.2.7.1 Decode circuit block diagram

2. Working principle: this decode circuit is mainly composed of Mt1389, SDRAM and FLASH. Important conditions for the working of decode circuit have:

(1) Reset: refer to reset circuit working principles for details.

(2) Clock: this system adopts 27M external clock input to produce the required clock signals through inside doubling circuit.

(3) Power: decode chip adopts 2 groups of power supply: 3.3V and 1.8V, in which 1.8V is mainly provided for internal logic control circuit, which is called core voltage by us.

After power on, reset circuit performs reset to Mt1389 built-in CPU (8032) and FLASH, decode chip outputs reset signals at the same time and performs reset to other circuits. After system reset, read signals are firstly sent to FLASH to read out information saved inside FLASH, machine displays powerOn picture, servo system begins to work and check whether door is closed to proper position and whether detect switch is shut, if not, action of closing door is performed. After detect switch is shut, machine begins to perform the preparations of disc reading and panel display.

Playback process: laser head picks up disc information from discs, through being processed by servo system, and sends to decode circuit for decoding, and signals after being decoded are saved in SDRAM. When machine required to replay signals, decode circuit calls out information inside SDRAM for output.

Save user information: information set by users is saved inside EEPROM and will be saved inside IC forever if users does not update or reset this information.

Audio, video output circuit: at present, Mt1389 integrates video D/A converter, Mt1389 integrates audio D/A converter inside, and manufacturers may select according to their own demands, therefore when in audio decode output, part is analog output and part is digital output. Please refer to circuit diagram and audio circuit for details.

3.2.8 Reset circuit

1. Reset circuit is shown in the figure 3.2.8.1:

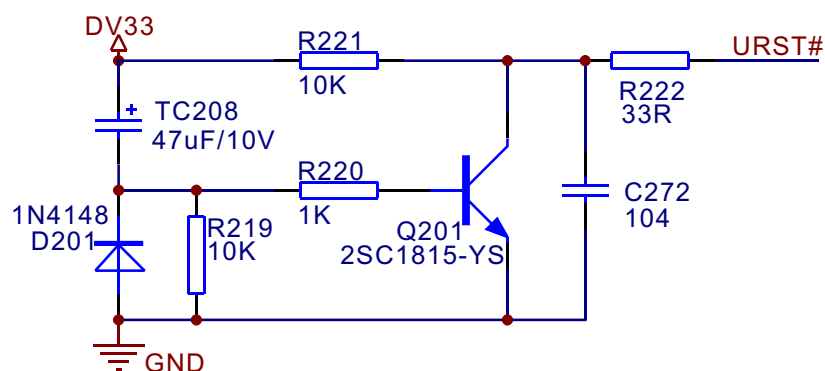


Figure 3.2.8.1 Reset circuit diagram

2. Working principle: after power on, voltage of Dv33 increases to 3.3V and main chip power supply is normal. Now, Tc208 cannot change voltage of Dv33 suddenly, base electrode of Q201 has current in, Q201 is saturated on, URST is low level. Dv33 charges Tc208 through emitter electrode of R219 and

Q201 to make voltage of cathode of Tc208 decreases gradually. When this voltage is below 0.7V, Q201 cuts off, URST changes into high level, and the process for URST from low to high is called low level effective reset signals by us. After power off, voltage of Dv33 decreases, Tc208 and Dv33 voltage decreases together, D201 performs surge discharge and clamping to TC208.

3. Key point voltage (unit: V)

Q201_B is low level when in normal conditions and changes from 3.3V to 0V at the moment of power on.

Q201_C is high level in when in normal conditions and changes from 0V to 3.3V at the moment of power on.

3.2.9 Video circuit

1. Video signals flow chart diagram is shown in the figure 3.2.9.1:

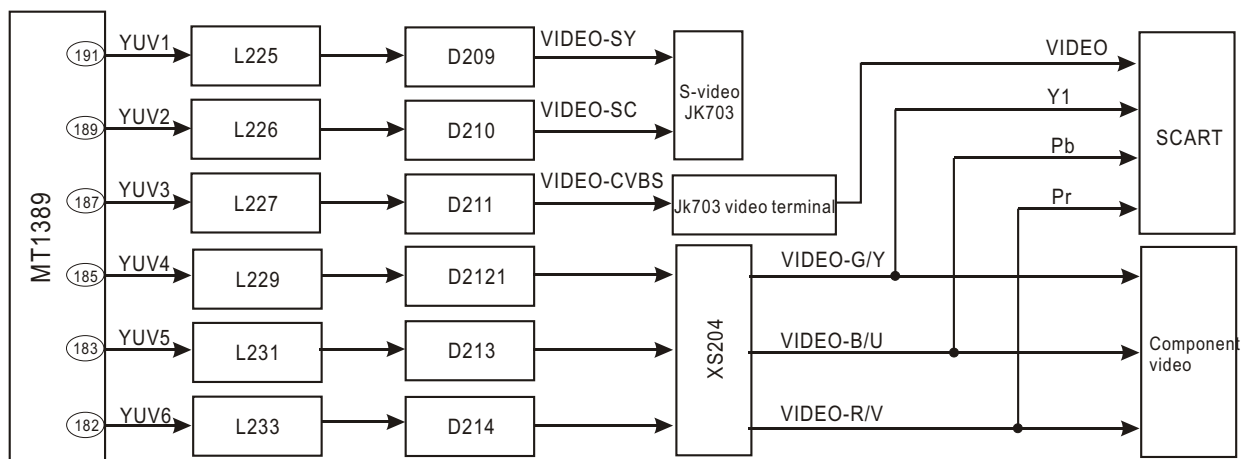


Figure 3.2.9.1 Video signal flow chart

2. Working principle: MT1389 has built-in video D/A conversion circuit, video output has R/B/G, Y/Pb/Pr, Y/Cb/Cr, CVBS, Y/C output mode, in which R/B/G, Y/Pb/Pr, Y/Cb/Cr, Y/C cannot output at the same time and need software to switch. CVBS is a separate output mode, 4-channel video signals outputted by MT1389, after video filtering and clamping, output to video terminal.

Shown in the figure 3.2.9.2, capacitor C287, C288 and inductor L227 compose a low-pass filter to filter high frequency interference signals except for useful signals; dual diode D211 composes a clamping circuit. It is known from features of diode that the most range of composite video signal CVBS cannot be over 5.7 and cannot lower than -0.7 in minimum, thus high voltage signals from TV set can be prevented from burning down the player.

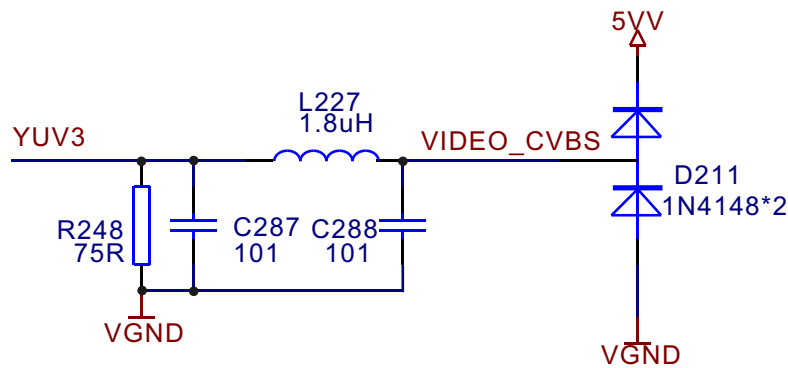


Figure 3.2.9.2 Video output circuit

3.2.10 Audio circuit

1. Audio circuit block diagram is shown in the figure 3.2.10.1:

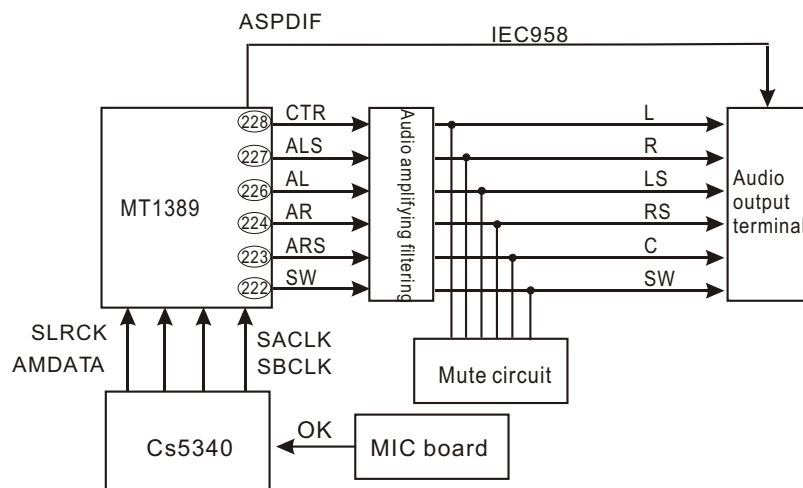


Figure 3.2.10.1 Audio circuit block diagram

2. Working principle: Mt1389 has built-in audio DAC conversion circuit, analog audio signals output directly from decode chip, through audio amplifying and filtering circuit, output audio signals directly to AV output board. Audio L, R signals are divided into two channel, in which one channel outputs to audio output terminal and the other channel outputs to headphone amplifying circuit on MIC board.

3. External Karaoke signal input and output

After MIC signals are being amplified by 4558, through CS5340 A/D conversion circuit, they switch into digital audio signals to input to decode chip for echo and volume processing circuit and output with audio signals L/R to reach the purpose of Karaoke.

3.2.11 Mute circuit

1. Mute circuit diagram is shown in the figure 3.2.11.1:

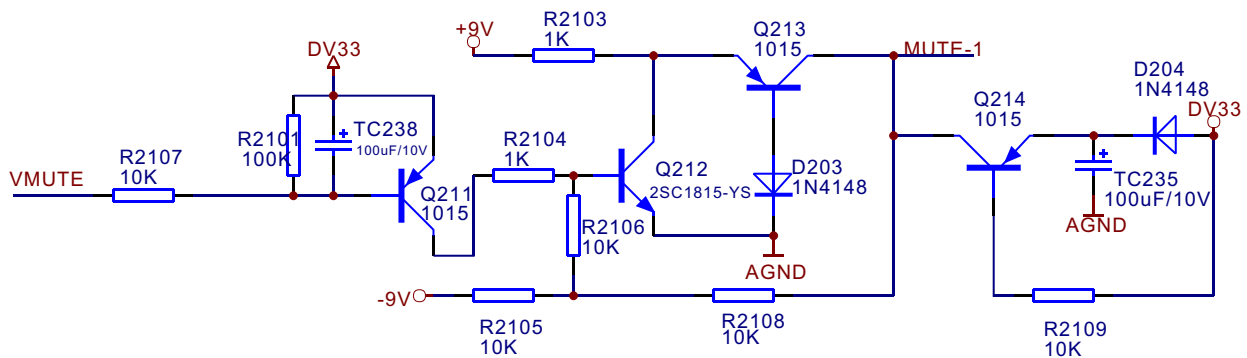


Figure 3.2.11.1 Mute circuit

2. Quieting circuit working principle:

When the player is working normally, shown in the figure 3.2.11.1, when chip is outputting analog audio signals, it outputs a low level signal at the same time to VMUTE to make Q211 on, voltage of Q211B electrode is about 2.7V, voltage of Q211 collector electrode is about 3.3V, so Q212 is also on; voltage of B electrode is about 0.7V, voltage of Q213 E electrode is close to zero, Q213 cuts off, MUTE-1 is negative voltage, which is added to base electrode of mute pipe of audio output end to make mute pipe cut off and audio signals output after being amplified by 4558. When in mute, MT1389 has no audio signals that output to operational amplifier, so audio output end of the player should have no audio output; electronic elements in circuit and IC will produce some noise to transmit to audio output end of the player, in order to filter these noise, decode chip outputs a high level signal to VMUTE to make Q211 cut off, so Q212 cuts off, +5V power transmits through E C electrode of Q213 to base electrode of switch pipe Q205-Q210 and circuit is in mute.

When the machine is not playing discs, decode chip outputs a high level signal to VMUTE to make circuit enter mute.

3. Power-off quieting working principle:

Shown in the figure 3.2.11.1, when the player is working normally, D204 is on, +5V charges capacitor TC235 through D204, now voltage of emitter electrode of Q214 is lower than voltage of base electrode and Q214 cuts off. When power off, +5V disappears, Q214 base electrode changes to low level, and its emitter base changes into high level because of discharge of TC235, now Q214 is on, collector electrode of Q214 (AMUTE) outputs high level to add to the base electrode of switch pipe Q205-Q210, switch is saturated, the noise produced in the course of power on and off is bypassed to ground, and power-off quieting function is realised.

4. Key point voltage (unit: V) is shown in the following table:

Keypoint	E	F	G	H	I	J	K	L	M
No mute	2.5	3.2	0.7	0.12	-0.15	-4.27	-4.27	4.9	4.9
Mute	3.2	-3.86	-3.87	1.4	0.7	1.3	-4	4.9	4.9

3.2.12 Power circuit

1. Power circuit block diagram is shown in the figure 3.2.12.1:

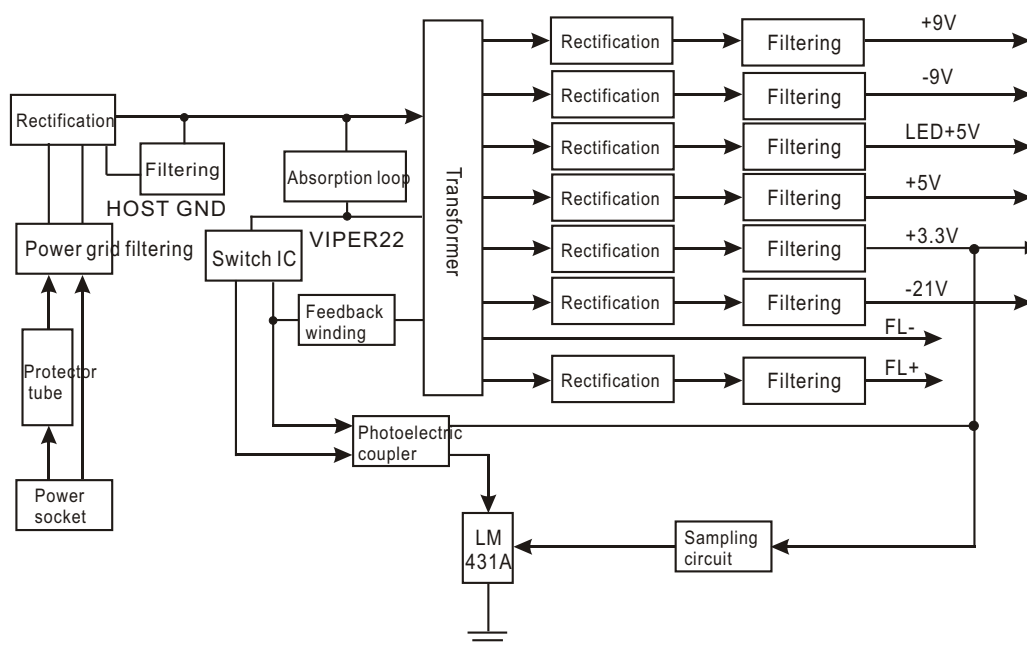


Figure 3.2.12.1 Power circuit block diagram

2. Working principle

(1) Power grid filtering circuit: various electromagnetic radiation exists in surrounding, so it will produce interference to inputted AC current. The function of power grid filtering circuit is to filter there interferences to make those that enter bridge rectification circuit are comparatively pure 220V AC power.

(2) Bridge rectifying and filtering circuit: the function of this circuit is to switch city power into DC power. Voltage after rectifying and filtering is 1.414 times of input power, so the DC voltage on two ends of TC501 is equal to 300V.

(3) Absorption loop: power always works in on/off state, so very high peak voltage will produce in the course of power on and off. In order to protect switch IC better, a peak absorption loop is added.

(4) Filtering circuit: the function is to produce a comparatively stable and small ripple DC voltage. In filtering circuit, "Π"-type filter is adopted most of the time. The features of capacitor filtering are that when load resistance is high and current is small, filtering is obvious; as for inductor filtering, when load resistance is small and current is large, filtering is obvious. To constitute capacitor into "Π"-type filter, better filtering effect may be achieved.

(5) Feedback loop: the time length of “on” and “off” in the same cycle inside switch module VEPR22 is decided by feedback loop. Feedback loop samples +3.3V output voltage; when output level is too high, voltage after being sampled is on high side, through feedback loop, space occupation ratio of pin 3 signal of VEPR22 is changed, “on” time reduced and output voltage begins to decrease. When output voltage is too low, voltage after being sampled is on low side, through feedback loop, space occupation ratio of VEPR22 increases, output voltage increases. Through the function of feedback loop, power board outputs stable voltage. LM431 used in this power is a 2.5V comparator. Compare sampling voltage with this 2.5V voltage, when sampling voltage is more than 2.5V (output voltage is on high side), LM431 is on, light emission diode in photoelectric coupler begins to emit light to make the other end of photoelectric coupler begin to be on; light emission of light emission diode is stronger, the degree of “on” is larger, the time of “on” of switch module VEPR22 decreases, output voltage begins to reduce. When sampling voltage is lower than 2.5V (output voltage is on low side), LM431 cuts off, “on” time of VEPR22 increases and output voltage increases, thus, through the auto control function of feedback loop, power board can output comparatively stable voltage.

3.2.13 Headphone circuit

1. Headphone circuit block diagram is shown in the figure 3.2.13.1:

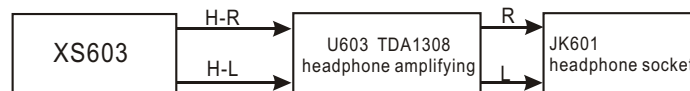


Figure 3.2.13.1 Headphone circuit block diagram

2. Working principle: H_L/H_R signals of audio output end are transmitted to the headphone amplifying circuit of MIC board through XS603 and headphone amplifying circuit is mainly composed of U603 (TDA1308).

Function of main pins of TDA1308: Pin 1, 7 is output pin; Pin 6, 2 is input pin;

Audio signals, after being amplified, output to headphone socket (JK601) directly.

3.2.14 MIC circuit

1. MIC circuit block diagram is shown in the figure 3.2.14.1:

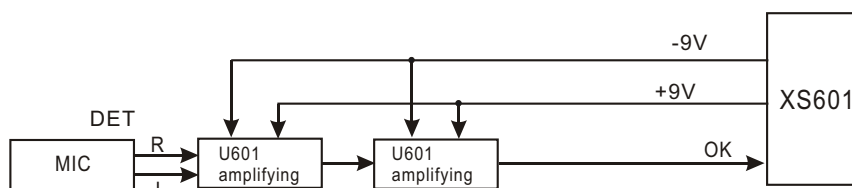


Figure 3.2.14.1 MIC circuit block diagram

2. Working principle

MIC part working principle: when microphone is inserted into MIC left, DET signals change from low level to high level to make mute circuit of decode part off. No matter disc reading is available, audio signals may be outputted. If this signal has trouble, microphone will have no sound when playback stops. After being filtering, signals inputted by microphone output to pin 5 of U601 and signals after discharge output from pin 7 of U601, after second amplifying, outputted by pin one of U601 to decode board directly for Karaoke signal processing and output together with audio signals to fulfil Karaoke function.

3.2.15 AV output board circuit

1. AV output board is mainly composed of SCART output terminal, ode switch circuit and filtering circuit. AV output board outputs different signals to connect with the relevant external devices. AV output board circuit block diagram is shown in the figure 3.2.15.1:

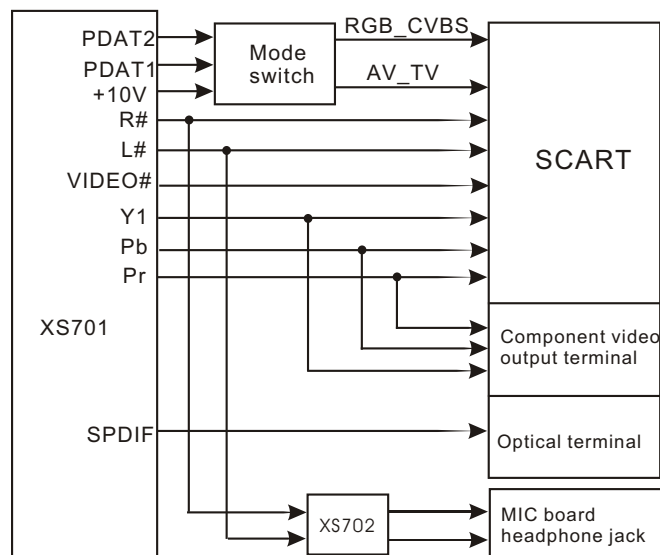


Figure 3.2.15.1 AV output board circuit block diagram

2. Introduction to SCART terminal

(1) Working principle: SCART terminal integrates video and audio all together and it may transmit video and audio signals at the same time. The operation is convenient, 21 pins in all and lies in the central part on the rear side of the player.

(2) SCART terminal pin function is shown as the following table:

Pin	Name	Signal direction	Function description	Pin	Name	Signal direction	Function description
1	A(B)OUT	I	Audio right channel input	12	NC		Network communication data line 2
2	A(B)IN	O	Audio right channel output	13	RETURN		Pr signal ground
3	A(A)OUT	I	Audio left channel input	14	RETURN		Blanking signal ground

4	A-COM		Audio signal ground	15	RED I/O	I/O	Pr signal I/O port
5	RETURN		Pb signal ground	16	BLK I/O	I/O	Blanking signal I/O port ★
6	A(A)N	O	Audio left channel output	17	RETURN		Blanking signal ground
7	BLUE I/O	I/O	Pb signal I/O port	18	TRTURN		Composite video signal ground
8	FUNCSW	I	Function selection jack	19	V-OUT	I	Composite video signal input
9	RETURN		Y1 signal ground	20	V-IN	O	Composite video signal output
10	CONT	I/O	Network communication data line 2	21	GND		Common
11	GREEN I/O	I/O	Y1 signal I/O port				

(3) SCART terminal function selection is shown as the following table:

PDAT0	PDAT1	PDAT2	Pin 8 of SCART terminal	Function
0	x	0	10V	AV4:3
0	x	1	7.5V	AV16:9
1	x	0	0.90V	TV
1	x	1	0.85V	TV
x	0	x	x	CVBS MODE
x	1	x	x	RGB MODE

Note: PDAT0 and PDAT2 are used to control input voltage of pin 8 of SCART terminal; PDAT1 is used to control voltage change of pin 16 of SCART terminal and the voltage on pin 16 controls SCART terminal to select RGB mode or CVBS mode.

3.2.16 Panel control circuit

1. Panel control circuit block diagram is shown in the figure 3.2.16.1:

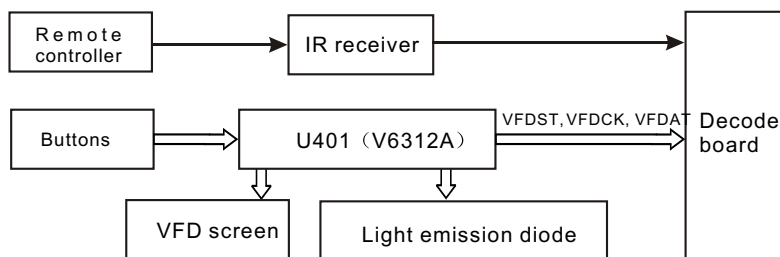


Figure 3.2.16.1 Panel control circuit block diagram

2. Working principle: panel components are divided into main panel and subordinate panel. Main panel is mainly composed of VFD display screen, drive chip V6312A, remote controller IR receiver and indicator light; subsidiary panel is composed of power button and power indicator light.

VFD screen is a vacuum fluorescence display screen and working principle is the same with that of CRT, which depends on striking fluorescence powder. GRID1~GRID8 is segment control, equal to grid electrode, speed up electronic emission, responsible for the display selection with the netlike range in screen. SEG1~SEG9 is bit control, connected on single character with fluorescence powder on it, and it will emit light and display when electronics strike it and responsible for the display of character.

The function of U401 (V6312A) is to process data signals sent from decode board to drive screen to display the relevant state, and scan the panel buttons matrix at the same time, after processing button information, send to CPU in the means of digital signals to control the player to make the relevant action.

Pin 2 of remote control IR receiver HS0038B3V is 5V power supply pin, pin 1 is grounded, pin 3 is output pin; after the receiver processes button information of remote controller, it outputs from pin 3 to send to decode board directly.

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Symptom: no OSD

Description: there is picture and sound, no OSD

Analysis and troubleshooting: use voltage level of multimeter to test 5V, +9V, -9V voltage of power board and they are all normal. Check decode board socket XS201+5V voltage and it is normal, each transmission data signal of decode board is normal, check display screen power supply +21V on main panel and there is no voltage, so we doubt that main panel +21V limiting resistor R418 has trouble, use resistance level of multimeter to test the resistance value and it is infinite; after changing it, trouble is removed.

[Example 2] Symptom: STOP button has no function

Description: power on and read disc, press PLAY button and there is function, press PAUSE button again and there is function.

Analysis and troubleshooting: firstly check whether pin 1 of light touch switch K402 of main panel has activating signal, voltage is 3.5V and it is normal; press PAUSE button, use voltage level of multimeter to test voltage of another pin not adjacent and it is 3.5V and the normal voltage is 0.7V, so we doubt that it is caused by the trouble of DZ404 diode to make pin 11 of IC6312 cannot be on; after changing it, trouble is removed.

[Example 3] Symptom: power not on

Description: +5V, +9V, -9V, +3.3V have no output

Analysis and troubleshooting: check power board and find that each voltage has no output; check and find that 220V voltage input is normal; bridge rectification circuit has no voltage output; use multimeter to test fuse tube and it has open circuit ; change fuse tube and trouble is not removed. Test anode of TC501 and there is still no voltage output, fuse tube has been burnt down again, check 4 diode of bridge rectification circuit and they are all normal; TC501 has no abnormalities of leakage and stricken through; test pin 1, 8 of U501 (switch IC) and has short circuit, this IC has been stricken through; after changing this IC, trouble is removed.

[Example 4] Symptom: not read disc

Description: not read any disc

Analysis and troubleshooting: check laser head, light emission, feed, main axis and trace and they are all normal but there is no focus action; use multimeter to test pin 13, 14 of U301 (5888) and voltage is normal (about 1.4V), test pin 1, 2 of Xs301 and voltage is also normal, check nerve flat cable and touch is good, so it is judged that laser head focus winding is burnt down; after changing loader, trouble is removed.

[Example 5] Symptom: power not on

Description: +5V, +9V, -9V, +3.3V have no output

Analysis and troubleshooting: check power board and find that each path voltage has no output, check and find that 220V voltage input is normal, bridge rectification circuit has no voltage output; use multimeter to test fuse tube and it has open circuit, change fuse tube and trouble is not removed, test anode of TC501 and there is still no voltage output, fuse tube has been burnt down, check 4 diode of bridge rectification circuit and they are all normal, TC501 has no abnormalities of leakage and stricken through, test pin 1 and 8 of U50 (switch IC) and it has short circuit, this IC has been stricken through; after changing IC, trouble is removed.

[Example 6] Symptom: power not on

Description: +5V, +9V, -9V have output, bu +3.3V has no output

Analysis and troubleshooting: test each path voltage output of power board and find that there is no +3.3V voltage output, check C510, TC506, TC505, L507, D507 and they are all normal, check D509 cathode and find that there is no voltage output, test D509 and find that it has open circuit, after changing D509, trouble is removed.

[Example 7] Symptom: headphone has no sound

Description: audio, video output are normal

Analysis and troubleshooting: when reading disc, audio and video output is normal; use oscillograph to test pin 1, 3 in AV board XS702 and there is waveform output; use multimeter to test voltage of pin 3, 5 of MIC board U603 (TDA1308) and it is 5V without abnormality; test pin 8 voltage and it is also 5V, power supply is normal; use oscillograph to test pin 2, 6 of U603 and there is waveform input, test pin 1, 7 and there is no output, after changing U603, trouble is removed.

[Example 8] Symptom: no MIC

Description: when reading discs, sound and picture are normal

Analysis and troubleshooting: power on, use remote controller to turn on MIC, insert microphone and speak, use oscillograph to test pin 4 (OK) of MIC board XS601 and find that there is no signal output,

Check voltage of pin 4, 8 (+9V, -9V) of U601 and it is normal; use oscillograph to test pin 5 of U601 (4558) and there is signal input, test pin 7 of U601 and there is no signal output, after changing U601, trouble is removed.

[Example 9] Symptom: no sound

Description: picture output is normal

Analysis and troubleshooting: test pin 1, 7 of operational amplifier of sound output circuit and there is no signal output; test power supply voltage of operational amplifier and it is 9V, which is on low side; after removing load, test power board 9V voltage output and it is normal, so we confirm that trouble lies in decode board part. Only U209 of decode board has +9V power supply, test resistance to ground of pin 8 and it is 86, which is infinite in normal conditions; after changing U209, trouble is removed.

[Example 10] Symptom: power not on

Description: switch on power, picture of the player has no output, panel has no OSD and panel buttons have no function.

Analysis and troubleshooting: check power board and find that each path voltage has no output, check and find that 220V voltage input is normal, check bridge rectification circuit and voltage output is normal, test anode of TC501 and voltage is 310V, which is normal, test pin 1, 8 of U501 (switch IC) and they are short-circuited, this IC has been stricken through; after changing IC, trouble is removed.

[Example 11] Symptom: not read disc

Description: not read any disc

Analysis and troubleshooting: check laser head, light emission, feed, main axis and trace and they are all normal, but there is no focus action; use multimeter to test pin 13, 14 of U302 (5888) and voltage is 2.28V, 2.36V, which is normal; test pin 1,2 of Xs301 and voltage is also normal; check nerve flat cable and contact is good, so we judge that laser head focus winding has been burnt down, after changing loader, trouble is removed.

[Example 12] Symptom: no MIC

Description: microphone is invalid

Analysis and troubleshooting: power on, use remote controller to turn on MIC, insert microphone and speak, use oscillograph to test XS601 on OK board and find that there is signal input, check voltage of pin 4, 8 (+9V, -9V) of U601 and it is normal; use oscillograph to test pin 5 of U601 (4558) and find that there is signal input and input signals are normal; test pin 7 of U601 and there is no signal output, check elements around and there is no abnormality, so we doubt that U601 is damaged, after changing U601, trouble is removed.

[Example 13] Symptom: AV output has no colour

Description: when in AV output, there is only black and white picture output without colour, other video port output also has abnormality.

Analysis and troubleshooting: test other port output and there is still no colour, which means that trouble should lie in decode circuit; check decode chip and each voltage is normal; according to circuit working principle, this trouble often appear due to the influence of clock frequency; use electric iron to heat 27M crystal oscillograph and find that picture has flickering and colour appears sometimes; after changing 27M crystal oscillograph, trouble is removed.

[Example 14] Symptom: not read CD disc

Description: can play DVD disc and MP3 disc, not read CD disc

Analysis and troubleshooting: check laser head, focus, feed, main axis and trace and they are normal, test Q302 emitter electrode voltage and it is on low side, which should be 3.1V in normal conditions, so we doubt that R302 resistor has been damaged, use multimeter to test the resistance value and it is infinite, after changing resistor, trouble is removed.

[Example 15] Symptom: not read DVD disc

Description: all discs can be read, except for DVD disc

Analysis and troubleshooting: check laser head, focus, feed, main axis and trace and they are all normal but no light emission; check emitter electrode voltage of Q301 and it is 3.3V, which is normal, and collector electrode voltage is 2.2V, which is normal; check inductor L312 between collector electrode and pin 2 of Xs301 and find that inductor has open circuit; after changing inductor, trouble is removed.

[Example 16] Symptom: no MIC

Description: insert microphone and speak, there is sound output and disc sound output is normal

Analysis and troubleshooting: power on and insert microphone, use oscillograph to test OK signal of pin2 of XS302 and find that this pin has no OK signal; when checking pin 7 output of MIC board U601, OK signal output is abnormal; when inserting and unplugging microphone, DET detect signal voltage is always 3.3V, after changing MIC holder, trouble is removed.

[Example 17] Symptom: noise appear when power off

Description: at the moment of power off, audio output had noise and TV speaker has a bump sound.

Analysis and troubleshooting: when this kind of trouble appears, trouble lies in power-off noise removing circuit; firstly, test MUTE-1 voltage of C electrode of Q214 at the moment of power off and find that this point voltage changes from -7.8V to 0.5V gradually; use multimeter to test circuit elements around Q214 and find that D204 1N4148 diode has been stricken through, after changing it, trouble is removed.

3.3.2 Troubleshooting flow chart

1. Troubleshooting process for “Power not on” is shown in the figure 3.3.2.1:

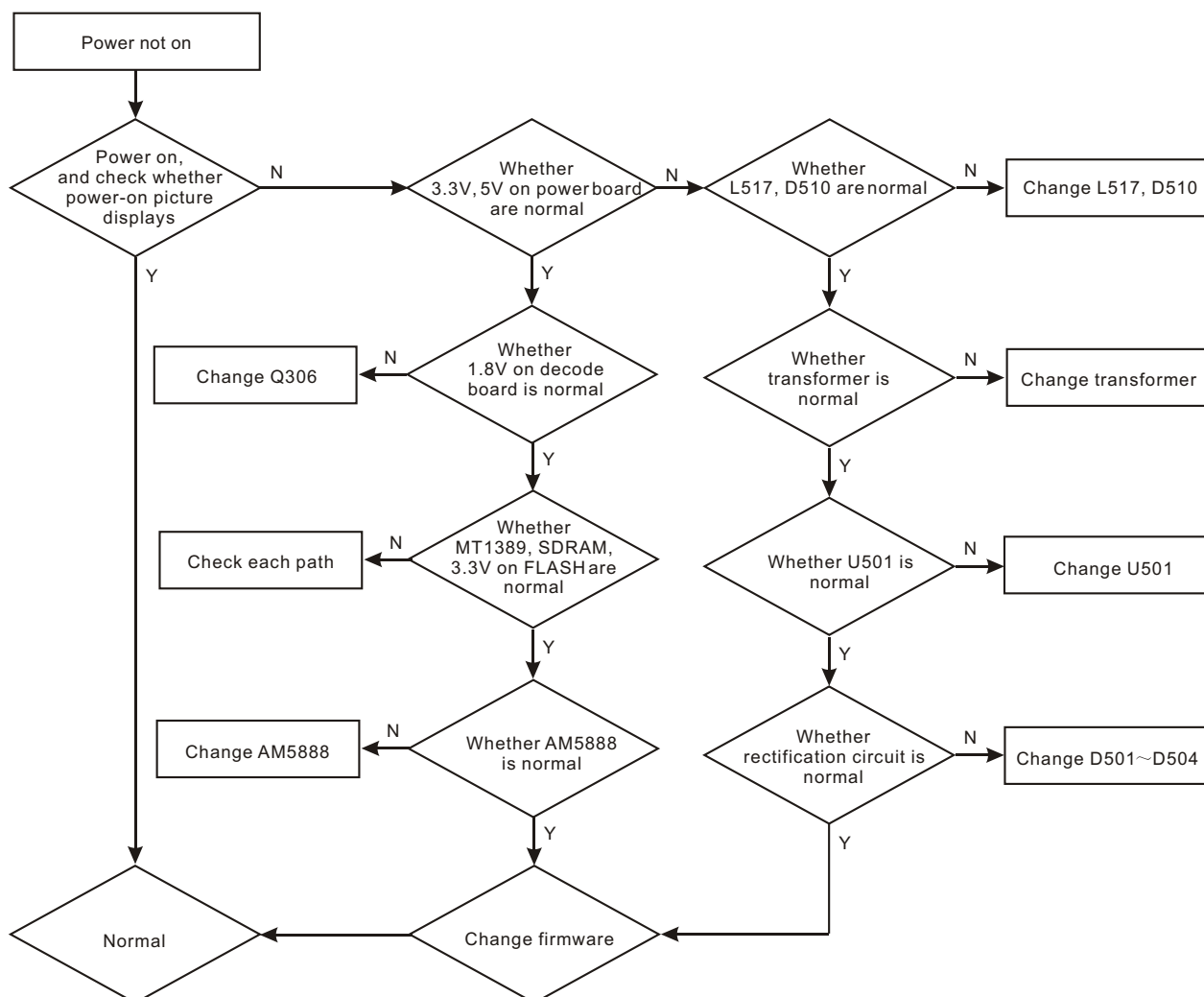


Figure 3.3.2.1 Troubleshooting flow chart for “Power not on”

2. Troubleshooting process for “Not start up” is shown in the figure 3.3.2.2:

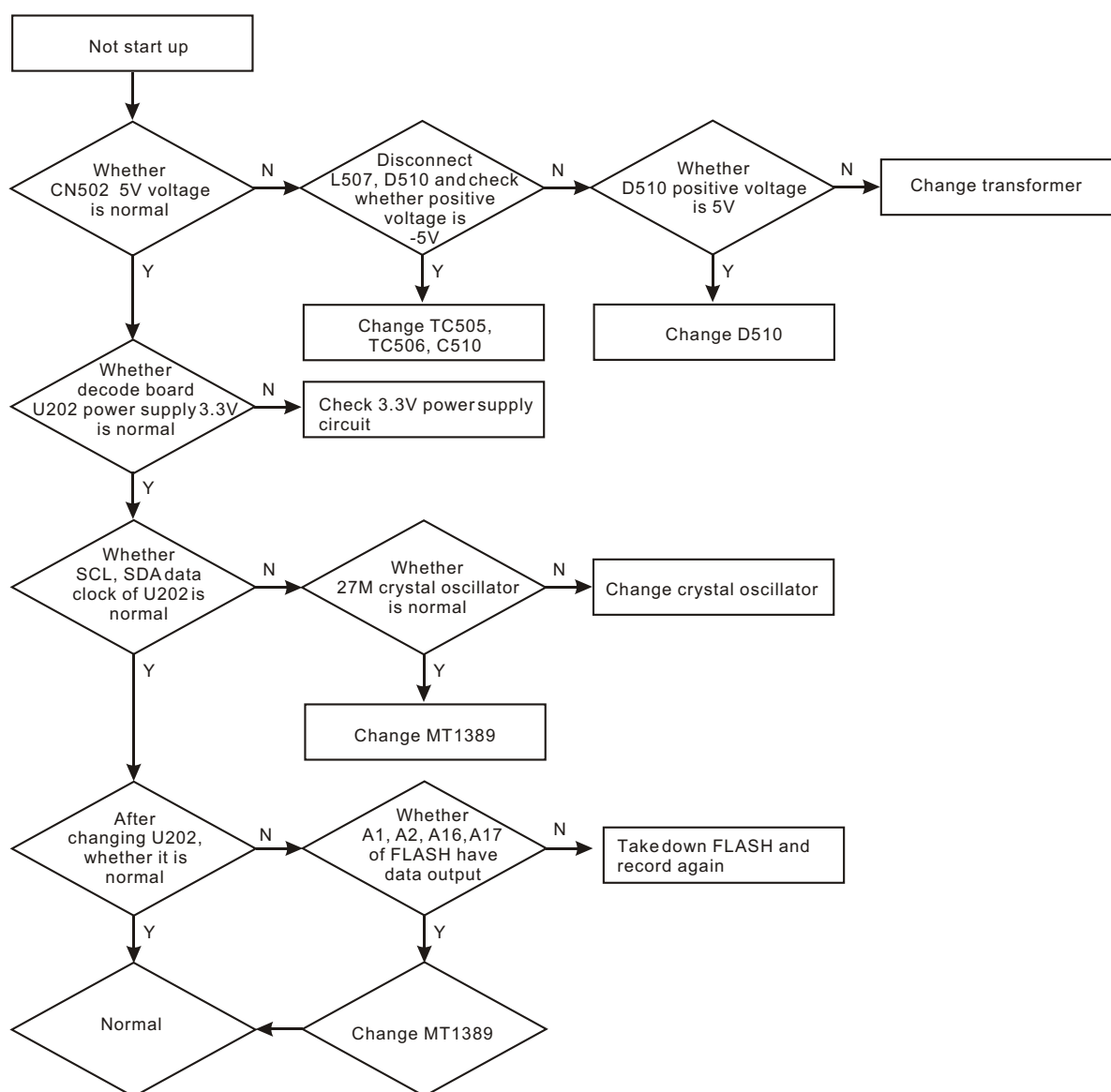
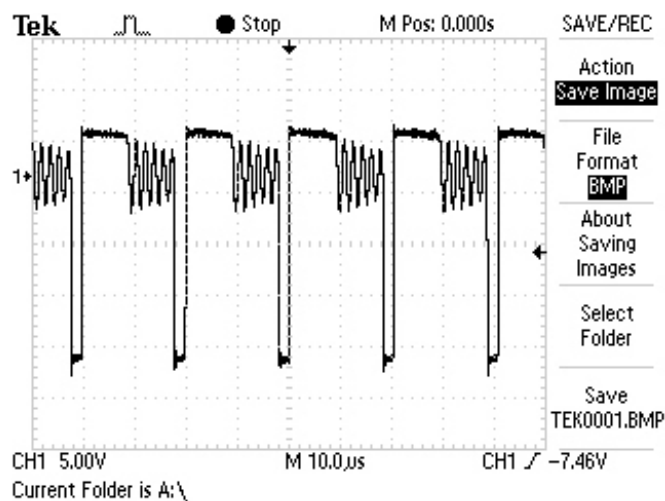


Figure 3.3.2.2 Troubleshooting flow chart for “Not start up”

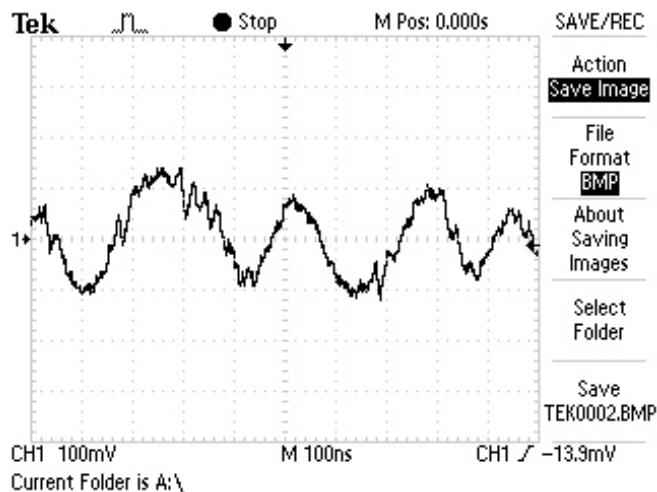
Section Four Waveform diagram

This section collects signal waveform diagram of audio, video and each unit circuit with the purpose to help servicing personnel to judge where trouble lies in accurately and quickly to improve servicing skills. For the difference of oscillograph's type, model and tuner, a certain difference may exist, so the servicing personnel are expected to pay more attention to check in daily operation.

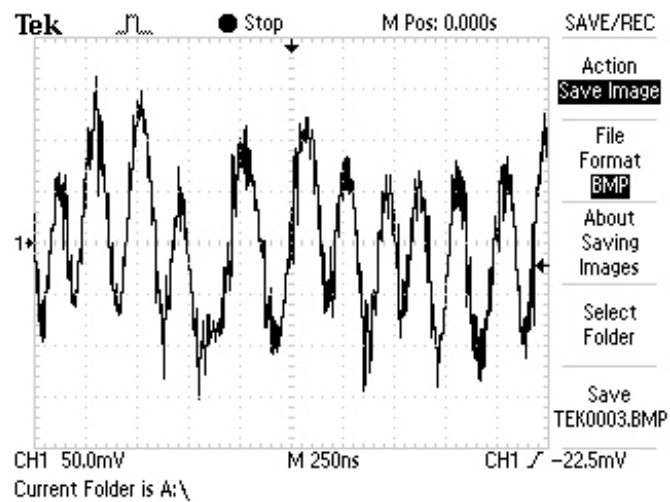
1. Waveform diagram for pulse DC of power board D513 anode



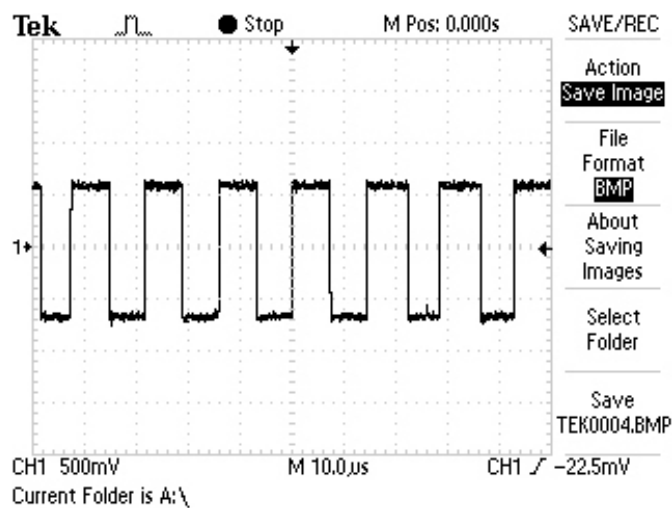
2. RFO signal waveform diagram of pin 17 of XS301



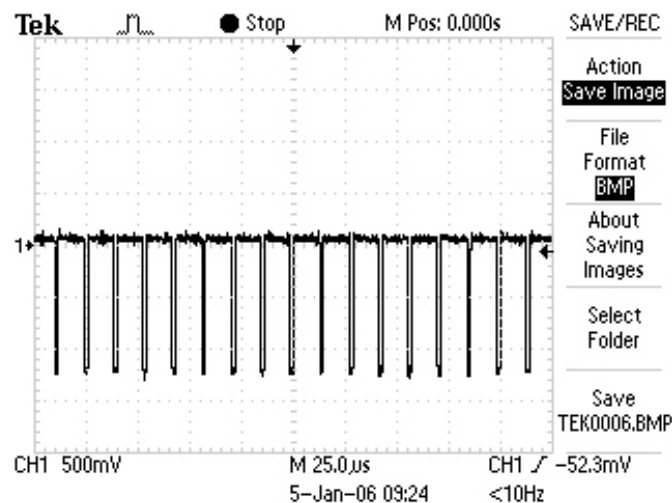
3. Asignal waveform diagram of pin 15 of XS301(B、C、D、E、F)



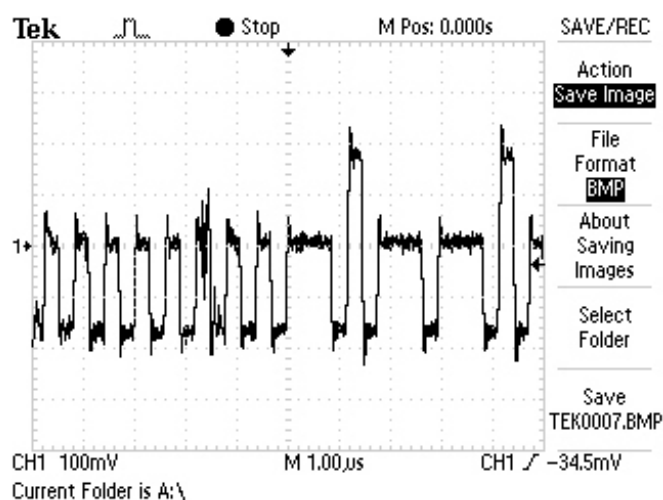
4. DMO signal (when there is main axis rotation) waveform diagram of pin 37 of U201 (Mt1389)



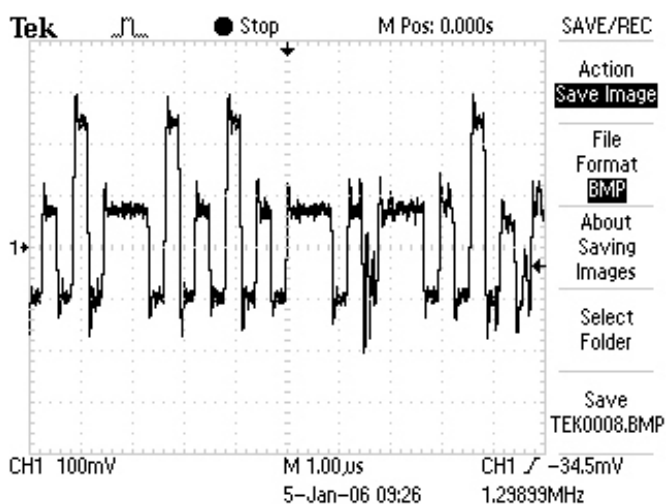
5. FMO signal (when there is feed) waveform diagram of pin 38 of U201 (MT1389)



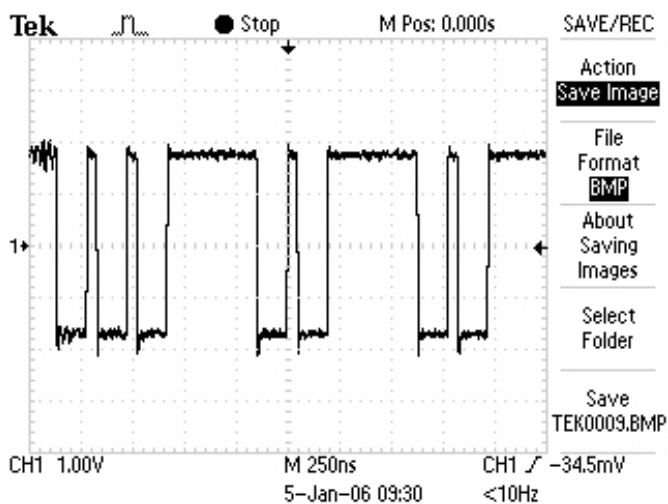
6. TRO signal (when there is trace) waveform diagram of pin 41 of U201 (MT1389)



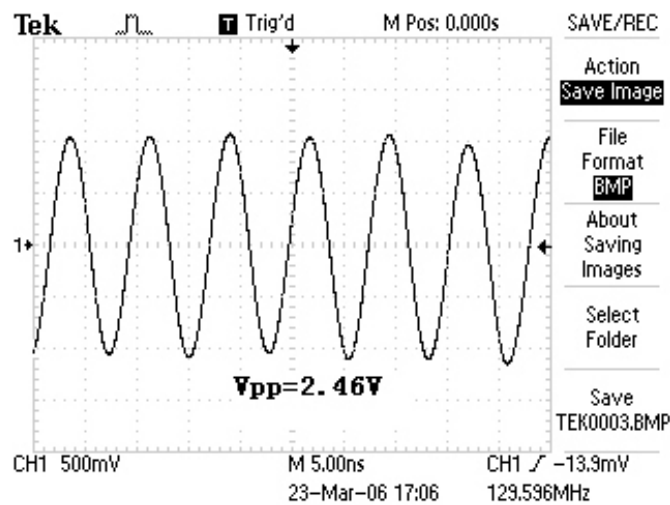
7. FOO signal (when there is focus) waveform diagram of pin 42 of U201 (MT1389)



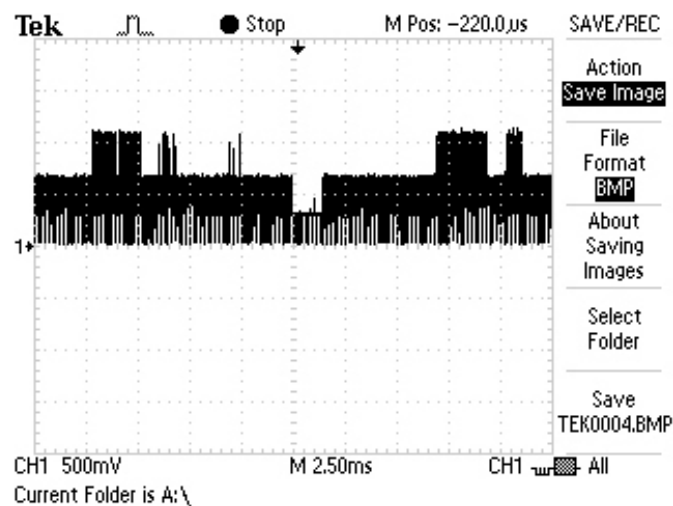
8. Waveform diagram of pin 29 (when no disc in) of U207(FLASH)



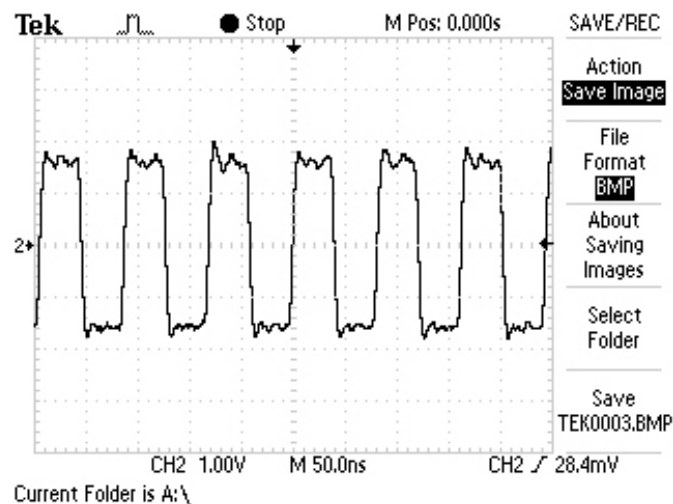
9. Waveform diagram of pin 38 of U208 (SDRAM)



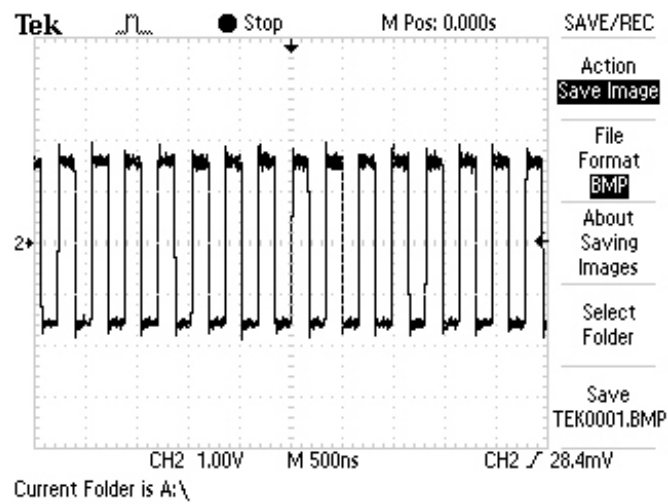
10. Video signal waveform diagram



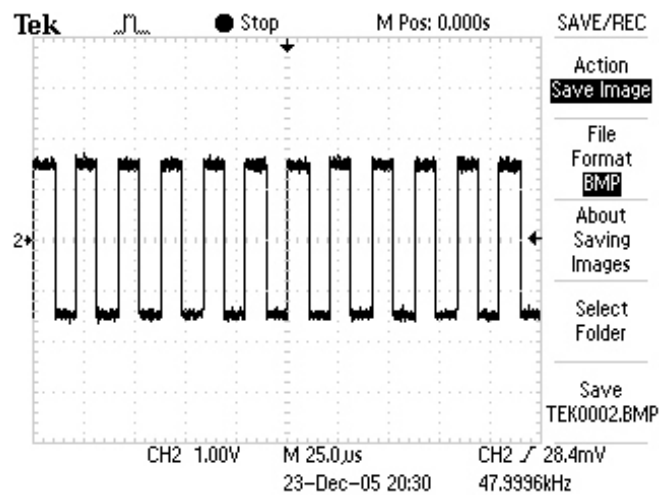
11. ACLK (12.2878MHz): waveform diagram for external clock signal



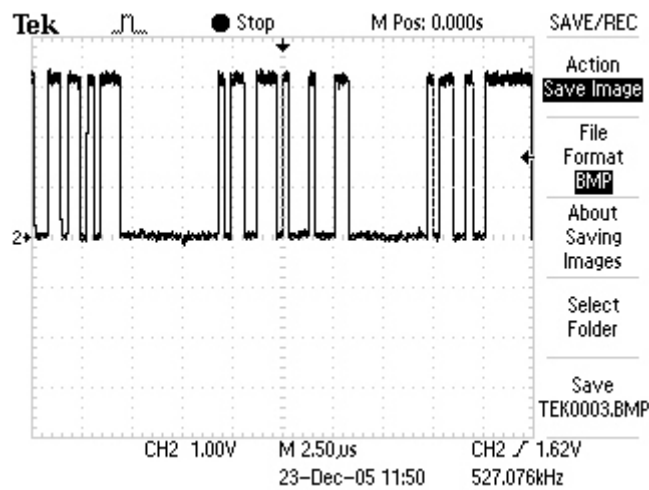
12. ABCK (3.07195MHZ): waveform diagram for bit clock signal



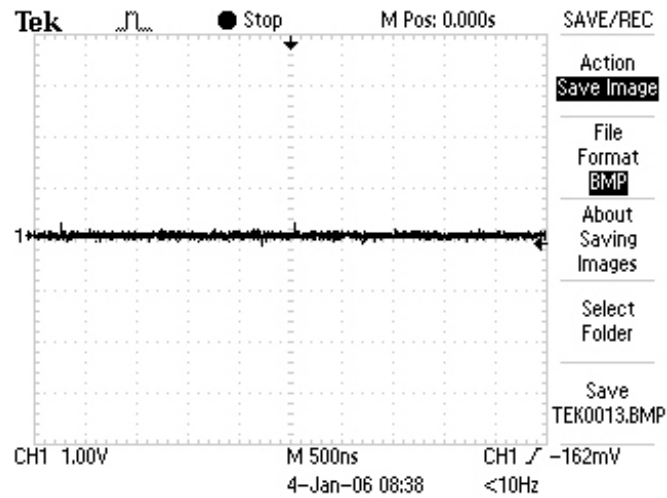
13. ALRCK (48KHZ): waveform diagram for left/right channel clock signal



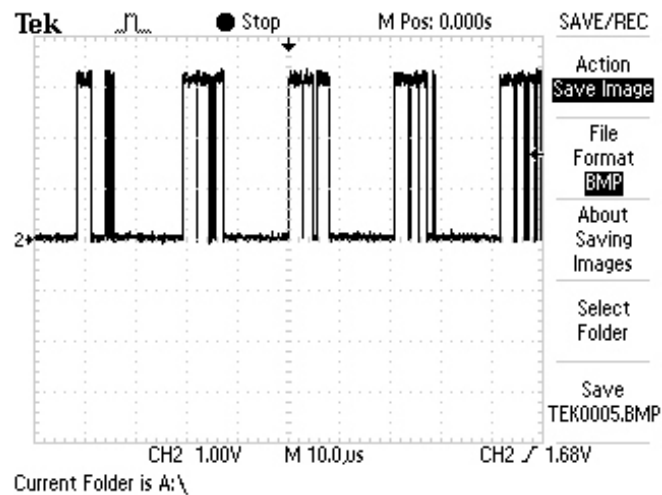
14. SDATA0: waveform diagram for mixed left/right channel digital signal



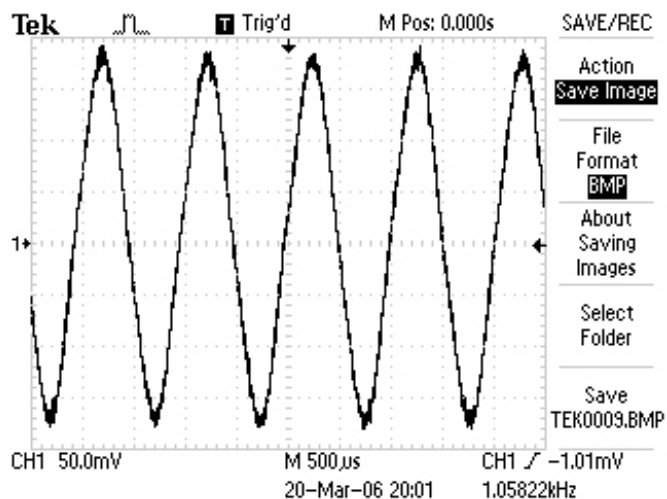
15. SDATA1: waveform diagram for surround left/right channel digital signal (now the disc being played is 2.1CH, and this signal has no output; if 5.1CH, the form is the same with that of SDATA0)



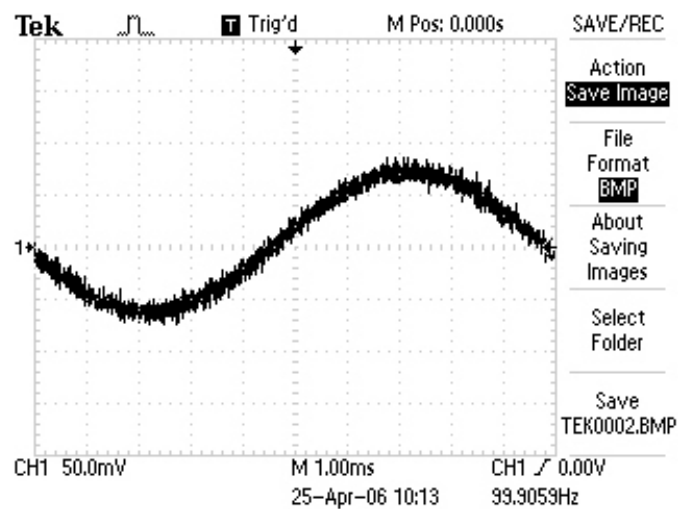
16. SDATA2: waveform diagram for centre subwoofer digital signal



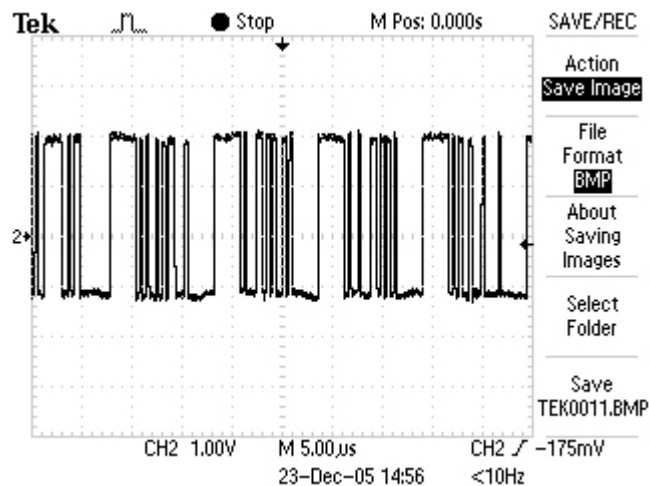
17. 1KHZ audio signal output waveform diagram (test disc is recommended to use; if not, the test waveform will change at any time to affect judgment).



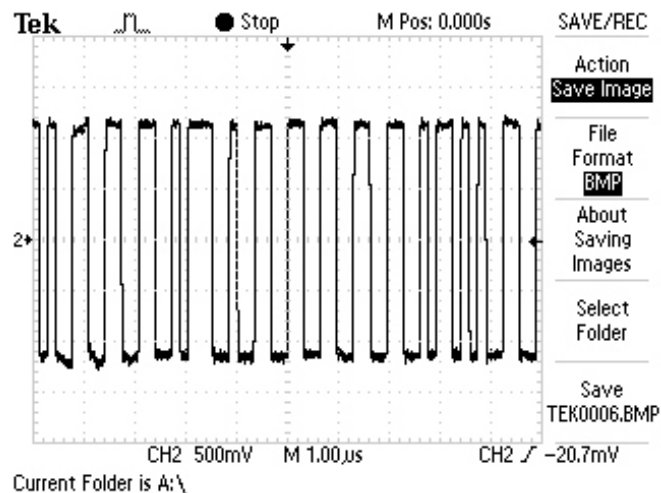
18. LEF#: waveform diagram for subwoofer channel analog signal



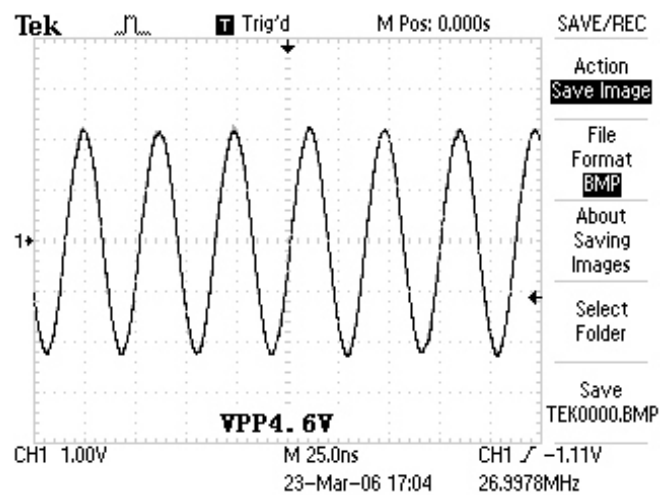
19. AMDAT: waveform diagram for microphone signal after 5340 A/D conversion



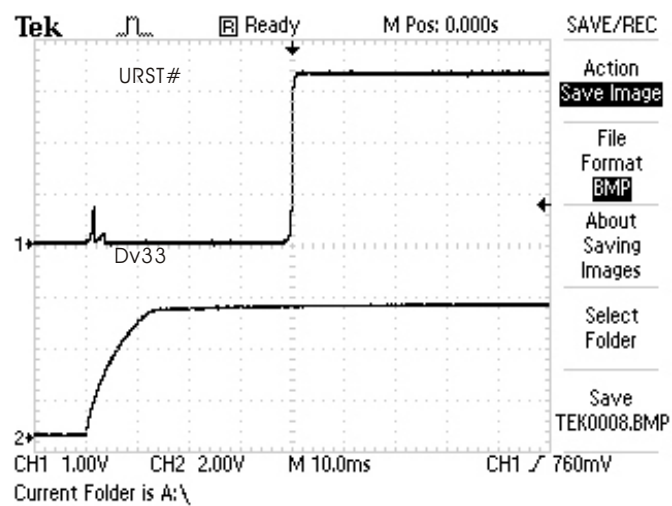
20. SPDIF: waveform diagram for optical/coaxial digital audio signal



21. 27M clock signal waveform diagram



22. Reset circuit waveform diagram



Section Five Function Introduction to IC

3.5.1 function introduction to MT1389HD

1. Description

MT1389HD is a cost-effective DVD system-on-chip (SOC) which incorporates advanced features like MPEG-4 video decoder, high quality TV encoder and state-of-art de-interlace processing.

Based on MediaTek's world-leading DVD player SOC architecture, the MT1389E is the 3rd generation of the DVD player SOC. It integrates the MediaTek 2nd generation front-end analog RF amplifier and the Servo/MPEG AV decoder.

To enrich the feature of DVD player, the MT1389 equips a simplified MPEG-4 advanced simple profile (ASP) video decoder to fully support the DivX1 Home Theater profile. It makes the MT1389-based DVD player be capable of playback MPEG-4 content which become more and more popular.

The progressive scan of the MT1389HD utilized advanced motion-adaptive de-interlace algorithm to achieve the best movie/video playback. It also supports a 3:2 pull down algorithm to give the best film effect. The 108MHz/12-bit video DAC provides users a whole new viewing experience.

2. General Feature lists

(1)Integration DVD player single chip

High performance analog RF amplifier

Servo controller and data channel processing

MPEG-1/MPEG-2/JPEG video

Dolby AC-3/DTS Decoder

Unified memory architecture

Versatile video scaling & quality enhancement

OSD & Sub-picture

Built-in clock generator

Built-in high quality TV encoder

Built-in progressive video processor

Audio effect post-processor

Built-in 5.1-ch Audio DAC

(2)High Performance Analog RF Amplifier

Programmable fc

Dual automatic laser power control

Defect and blank detection

RF level signal generator

(3)Speed Performance on Servo/Channel Decoding

DVD-ROM up to 4XS

CD-ROM up to 24XS

(4)Channel Data Processor

Digital data slicer for small jitter capability

Built-in high performance data PLL for channel data demodulation

EFM/EFM+ data demodulation

Enhanced channel data frame sync protection & DVD-ROM sector sync protection

(5)Servo Control and Spindle Motor Control

Programmable frequency error gain and phase error gain of spindle PLL to control spindle motor on CLV and CAV mode

Built-in ADCs and DACs for digital servo control

Provide 2 general PWM

Tray control can be PWM output or digital output

(6)Embedded Micro controller

Built-in 8032 micro controller

Built-in internal 373 and 8-bit programmable lower address port

1024-bytes on-chip RAM

Up to 2M bytes FLASH-programming interface

Supports 5/3.3-Volt. FLASH interface

Supports power-down mode

Supports additional serial port

(7)DVD-ROM/CD-ROM Decoding Logic

High-speed ECC logic capable of correcting one error per each P-codeword or Q-codeword

Automatic sector Mode and Form detection

Automatic sector Header verification

Decoder Error Notification Interrupt that signals various decoder errors

Provide error correction acceleration

(8)Buffer Memory Controller

Supports 16Mb/32Mb/64Mb SDRAM

Supports 16-bit SDRAM data bus

Provides the self-refresh mode SDRAM

Block-based sector addressing

(9)Video Decode

Decodes MPEG1 video and MPEG2 main level, main profile video (720/480 and 720x576)Decodes

MPEG-4 Advanced Simple Profile

Support DivX 3.11/4.x/5.x Home Theater Profile

Support Nero-Digital

Smooth digest view function with I, P and B picture decoding

Baseline, extended-sequential and progressive JPEG image decoding

Support CD-G titles

(10)Video/OSD/SPU/HLI Processor

Arbitrary ratio vertical/horizontal scaling of video, from 0.25X to 256X

65535/256/16/4/2-color bitmap format OSD,

256/16 color RLC format OSD

Automatic scrolling of OSD image

(11)Audio Effect Processing

Dolby Digital (AC-3)/EX decoding

DTS/DTS-ES decoding

MPEG-1 layer 1/layer 2 audio decoding

MPEG-2 layer1/layer2 2-channel audio

High Definition Compatible Digital (HDCD)

Windows Media Audio (WMA)

Dolby ProLogic II

Concurrent multi-channel and downmix out

IEC 60958/61937 output

PCM / bit stream / mute mode

Custom IEC latency up to 2 frames

Pink noise and white noise generator

Karaoke functions

Microphone echo

Microphone tone control

Vocal mute/vocal assistant

Key shift up to +/- 8 keys

Chorus/Flanger/Harmony/Reverb

Channel equalizer

3D surround processing include virtual surround and speaker separation

(12)TV Encoder

Four 108MHz/12bit DACs

Support NTSC, PAL-BDGHINM, PAL-60

Support 525p, 625p progressive TV format

Automatically turn off unconnected channels

Support PC monitor (VGA)

Support Macro vision 7.1 L1, Macro vision 525P and 625P

CGMS-A/WSS

Closed Caption

(13)Progressive Scan Video

Automatic detect film or video source

3:2 pull down source detection

Advanced Motion adaptive de-interlace

Minimum external memory requirement

(14)Outline

216-pin LQFP package

3.3/1.8-Volt. Dual operating voltages

3. Pin Definitions

PIN	Main	Alt	Type	Description
RF interface (26)				
231	RFGND18		Ground	Analog ground
132	RFVDD 18		Power	Analog power 1.8V
252	OSP		Analog output	RF Offset cancellation capacitor connecting
253	OSN		Analog output	RF Offset cancellation capacitor connecting
254	RFGC		Analog output	RF AGC loop capacitor connecting for DVD-ROM
255	IREF		Analog input	Current reference input. It generates reference current for RF path. Connect an external 15K resistor to this pin and AVSS
256	AVDD3		Power	Analog power 3.3V
1	AGND		Ground	Analog ground
2	DVDA		Analog input	AC couple input path A
3	DVDB		Analog input	AC couple input path B
4	DVDC		Analog input	AC couple input path C
5	DVDD		Analog input	AC couple input path D
6	DVDRFIP		Analog input	AC coupled DVD RF signal input RFIP

7	DVDRFIN		Analog input	AC coupled DVD RF signal input RFIN
8	MA		Analog input	DC coupled main beam RF signal input A
9	MB		Analog input	DC coupled main beam RF signal input B
10	MC		Analog input	DC coupled main beam RF signal input C
11	MD		Analog input	DC coupled main beam RF signal input D
12	SA		Analog input	DC coupled sub-beam RF signal output A
13	SB		Analog input	DC coupled sub-beam RF signal output B
14	SC		Analog input	DC coupled sub-beam RF signal output C
15	SD		Analog input	DC coupled sub-beam RF signal output D
16	CDFON		Analog input	CD focusing error negative input
17	CDFOP		Analog input	CD focusing error positive input
18	TNI		Analog input	3 beam satellite PD signal negative input
19	TPI		Analog input	3 beam satellite PD signal positive input
ALPC (4)				
20	MIDI1		Analog input	Laser power monitor input
21	MIDI2		Analog input	Laser power monitor input
22	LDO2		Analog output	Laser driver output
23	LDO1		Analog output	Laser driver output
ADC Power (2)				
244	ADCVDD3		Power	Analog 3.3V Power for ADC
245	ADCVSS		Ground	Analog ground for ADC
VPLL (3)				
43	VPLL VSS		Ground	Analog ground for VPLL
44	CAPPAD		Analog In/Out	VPLL External Capacitance connection
45	VPLL VDD3		Power	Analog 3.3V Power for VPLL
Reference voltage (3)				
28	V2REFO		Analog output	Reference voltage 2.8V
29	V20		Analog output	Reference voltage 2.0V
30	VREFO		Analog output	Reference voltage 1.4V
Analog monitor output (7)				
24	SVDD3		Power	Analog power 3.3V
25	CSO	RFOP	Analog output	1) Central servo 2) Positive main beam summing output
26	RFLVL	RFON	Analog output	1) RFRP low pass, or

				2) Negative main beam summing output
27	SGND		Ground	Analog ground
31	FEO		Analog output	Focus error monitor output
32	TEO		Analog output	Tracking error monitor output
33	TEZISLV		Analog output	TE slicing Level
Analog monitor output (6)				
246	RFVDD3		Analog output	Analog Power
247	RFRPDC		Analog Input	RF ripple detect output
248	RFRPAC		Analog output	RF ripple detect input(through AC-coupling)
249	HRFZC		Analog output	High frequency RF ripple zero crossing
250	CRTPLP		Analog output	Defect level filter capacitor connecting
251	RFGND		Ground	Analog Power
RF Data PLL Interface (9)				
235	JITFO		Analog output	Output terminal of RF jitter meter
236	JITFN		Analog Input	Input terminal of RF jitter meter
237	PLLVSS		Ground	Ground pin for data PLL and related analog circuitry
238	IDACEXLP		Analog output	Data PLL DAC Low-pass filter
239	PLLVDD3		Power	Power pin for data PLL and related analog circuitry
240	LPFON		Analog Output	Negative output of loop filter amplifier
241	LPFIP		Analog input	Positive input terminal of loop filter amplifier
242	LPFIN		Analog input	Negative input terminal of loop filter amplifier
243	LPFOP		Analog output	Positive output of loop filter amplifier
Motor and Actuator Driver Interface (10)				
34	OP_OUT		Analog output	Op amp output
35	OP_INN		Analog input	Op amp negative input
36	OP_INP		Analog input	Op amp positive input
37	DMO		Analog output	Disk motor control output. PWM output
38	FMO		Analog output	Feed motor control. PWM output
39	TROPENPW M		Analog output	Tray PWM output/Tray open output
40	PWMOUT1	ADIN0	Analog output	1) 1st General PWM output 2) AD input 0
41	TRO		Analog output	Tracking servo output. PDM output of tracking servo compensator

42	FOO		Analog output	Focus servo output. PDM output of focus servo compensator
50	FG (Digital pin)	ADIN1 GPIO	LVTTL3.3 Input, Schmitt input, pull up, with analog input path for ADIN1	1) Monitor hall sensor input 2) AD input 1 3) GPIO
General Power/Ground (18)				
55 93 142 160 174 213	DVDD18		Power	1.8V power pin for internal digital circuitry
81 178	DVSS		Ground	1.8V ground pin for internal digital circuitry
65 96 118 131 145 156 170 208	DVDD3		Power	3.3V power pin for internal digital circuitry
90 148	DVSS		Ground	3.3V ground pin for internal digital circuitry
Micro Controller and Flash Interface (48)				
62	HIGHA0		In/Out 4~16mA,SRPU	Microcontroller address 8
74	HIGHA1		In/Out 4~16mA,SRPU	Microcontroller address 9
73	HIGHA2		In/Out 4~16mA,SRPU	Microcontroller address 10
72	HIGHA3		In/Out 4~16mA,SRPU	Microcontroller address 11
71	HIGHA4		In/Out 4~16mA,SRPU	Microcontroller address 12
70	HIGHA5		In/Out 4~16mA,SRPU	Microcontroller address 13
69	HIGHA6		In/Out 4~16mA,SRPU	Microcontroller address 14
68	HIGHA7		In/Out 4~16mA,SRPU	Microcontroller address 15
89	AD7		In/Out 4~16mA,SRPU	Microcontroller address/data 7

86	AD6		In/Out 4~16mA,SRPU	Microcontroller address/data 6
85	AD5		In/Out 4~16mA,SRPU	Microcontroller address/data 5
84	AD4		In/Out 4~16mA,SRPU	Microcontroller address/data 4
83	AD3		In/Out 4~16mA,SRPU	Microcontroller address/data 3
82	AD2		In/Out 4~16mA,SRPU	Microcontroller address/data 2
80	AD1		In/Out 4~16mA,SRPU	Microcontroller address/data 1
79	AD0		In/Out 4~16mA,SRPU	Microcontroller address/data 0
92	IOA 0		In/Out 4~16mA,SRPU	Microcontroller address
77	IOA 1		In/Out 4~16mA,SRPU	Microcontroller address 1/ IO
56	IOA 2		In/Out 4~16mA,SRPU	Microcontroller address 2/ IO
57	IOA 3		In/Out 4~16mA,SRPU	Microcontroller address 3/ IO
58	IOA 4		In/Out 4~16mA,SRPU	Microcontroller address 4/ IO
59	IOA 5		In/Out 4~16mA,SRPU	Microcontroller address 5/ IO
60	IOA 6		In/Out 4~16mA,SRPU	Microcontroller address 6/ IO
61	IOA 7		In/Out 4~16mA,SRPU	Microcontroller address 7/ IO
67	A16		In/Out 4~16mA,SRPU	Flash address 16
91	A17		In/Out 4~16mA,SRPU	Flash address 17
63	A18		In/Out 4~16mA, SRPD,SMT	Flash address 18 /IO
64	A19		In/Out 4~16mA, SRPD,SMT	Flash address 19 /IO
75	A20	YUV0	In/Out 4~16mA, SRPD,SMT	5) Flash address 20 /IO 6) While External Flash size <= 1MB: I) Alternate digital video YUV output 0
87	A21	YUV7 GPIO	In/Out 4~16mA, SRPD,SMT	7) Flash address 21 /IO 8) While External Flash size <= 2MB: I) Digital video YUV output 7 II) GPIO
88	ALE		In/Out 4~16mA, SRPD,SMT	Microcontroller address latch enable
78	IOOE#		In/Out 4~16mA, SRPD,SMT	Flash output enable, active low / IO
66	IOWR#		In/Out 4~16mA, SRPD,SMT	Flash write enable, active low / IO
76	IOCS#		In/Out 4~16mA, SRPD,SMT	Flash chip select, active low / IO

94	UWR#		In/Out 4~16mA, SRPD,SMT	Microcontroller write strobe, active low
95	URD#		In/Out 4mA, SRPD,SMT	Microcontroller read strobe, active low
97	UP1_2		In/Out 4~16mA, SRPD,SMT	Microcontroller port 1-2
98	UP1_3		In/Out 4mA, SRPD,SMT	Microcontroller port 1-3
99	UP1_4		In/Out 4mA, SRPD,SMT	Microcontroller port 1-4
100	UP1_5		In/Out 4mA, SRPD,SMT	Microcontroller port 1-5
101	UP1_6	SCL	In/Out 4mA, SRPD,SMT	1) Microcontroller port 1-6 2) I2C clock pin
102	UP1_7	SDA	In/Out 4mA, SRPD,SMT	1) Microcontroller port 1-7 1) I2C data pin
103	UP3_0	RXD	In/Out 4mA, SRPD,SMT	1) Microcontroller port 3-0 2) 8032 RS232 RxD
104	UP3_1	TXD	In/Out 4mA, SRPD,SMT	1) Microcontroller port 3-1 2) 8032 RS232 TxD
105	UP3_4	RXD SCL	In/Out 4mA, SRPD,SMT	1) Microcontroller port 3-4 2) Hardwired RD232 RxD 3) I2C clock pin
106	UP3_5	RXD SDA	In/Out 4~16mA, SRPD,SMT	1) Microcontroller port 3-5 2) Hardwired RD232 TxD 3) I2C data pin
109	IR		Input SMT	IR control signal input
110	INT0#		In/Out 4~16mA, SRPD,SMT	Microcontroller external interrupt 0, active low
Audio interface (28)				
204	SPMCLK	SCLK0	In/Out	1) Audio DAC master clock of SPDIF input 2) While SPDIF input is not used: I) Serial interface port 0 clock pin II) GPIO
205	SPDATA	SDIN0	In/Out	1) Audio data of SPDIF input 2) While SPDIF input is not used:

				I) Serial interface port 0 data-in II) GPIO
206	SPLRCK	SDO0	In/Out	1) Audio left/right channel clock of SPDIF input 2) While SPDIF input is not used: I) Serial interface port 0 data-out II) GPIO
207	SPBCK	SDCS0 ASDATA 5	In/Out	1) Audio bit clock of SPDIF input 2) While SPDIF input is not used: I) Serial interface port 0 chip select II) Audio serial data 5 part I : DSD data sub-woofer Channel or Microphone output III) GPIO
209	ALRCK		In/Out 4mA, PD,SMT	1) Audio left/right channel clock 2) Trap value in power-on reset: I) 1: use external 373 II) 0: use internal 373
210	ABCK	Fs64	In/Out 4mA, SMT	1) Audio bit clock 2) Phase de-modulation
211	ACLK		In/Out 4mA, SMT	Audio DAC master clock
197	ASDATA0		In/Out 4mA, PD,SMT	1) Audio serial data 0 (Front-Left/Front-Right) 2) DSD data left channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 4) While using external channels:) GPO_2
202	ASDATA1		In/Out 4mA, PD,SMT	2) Audio serial data 0 (Front-Left/Front-Right) 2) DSD data right channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 4) While using external channels: I) GPO_2
203	ASDATA2		In/Out 4mA, PD,SMT	1) Audio serial data 1 (Left-Surround/Right-Surround) 2) DSD data left surround channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation

				4) While using external channels: I) GPO_1
212	ASDATA3		In/Out 4mA, PD,SMT	1) Audio serial data 2 (Center/LFE) 2) DSD data right surround channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 4) While only 2 channels output: I) GPO_0
214	ASDATA4	INT1#	In/Out 4mA, PD,SMT	1) Audio serial data 3 (Center-back/ Center-left-back/Center-right-back, in 6.1 or 7.1 mode) 2) DSD data center channel 18) While only 2 channels output: I) Digital video YUV output 6 II) GPIO
215	MC_DATA	INT2#	In/Out 2mA, PD,SMT	1) Microphone serial input 2) While not support Microphone: I) Microcontroller external interrupt 2 II) GPIO
216	SPDIF		Output 4~16mA, SR: ON/OFF	S/PDIF output
217	APLLVDD3		Power	3.3V Power pin for audio clock circuitry
218	APLLCAP		Analog In/Out	APLL External Capacitance connection
219	APLLVSS		Ground	Ground pin for audio clock circuitry
220	ADACVSS2		Ground	Ground pin for AUDIO DAC circuitry
221	ADACVSS1		Ground	Ground pin for AUDIO DAC circuitry
222	ARF		Output	1) AUDIO DAC Sub-woofer channel output 2) While internal AUDIO DAC not used: GPIO
223	ARS	GPIO	Output	1) AUDIO DAC Right Surround channel output 2) While internal AUDIO DAC not used: a. SDATA3 b. GPIO
224	AR	GPIO	Output	1) AUDIO DAC Right channel output 2) While internal AUDIO DAC not used: a. SDATA1

				b. GPIO
225	AVCM		Analog	AUDIO DAC reference voltage
226	AL	GPIO	Output	1) AUDIO DAC Left Surround channel output 2) While internal AUDIO DAC not used: a. SDATA2 b. GPIO
227	ALS	GPIO	Output	1) AUDIO DAC Left Surround channel output 2) While internal AUDIO DAC not used: a. SDATA0 b. GPIO
228	ALF	GPIO	Output	1) AUDIO DAC Center channel output 2) While internal AUDIO DAC not used: GPIO
229	ADACVDD1		Power	3.3V power pin for AUDIO DAC circuitry
230	ADACVDD2		Power	3.3V power pin for AUDIO DAC circuitry
Video Interface (18)				
196	DACVDDC		Power	3.3V power pin for VIDEO DAC circuitry
195	VREF		Analog	Bandgap reference voltage
194	FS		Analog	Full scale adjustment
193	YUV0	CIN	Output 4mA, SR	1) Video data output bit 0 2) Compensation capacitor
192	DACVSSC		Ground	Ground pin for VIDEO DAC circuitry
191	YUV1	Y	Output 4mA, SR	1) Video data output bit 1 2) Analog Y output
190	DACVDDB		Power	3.3V power pin for VIDEO DAC circuitry
189	YUV2	C	Output 4mA, SR	1) Video data output bit 2 2) Analog chroma output
188	DACVSSB		Ground	Ground pin for VIDEO DAC circuitry
187	YUV3	CVBS	Output 4mA, SR	1) Video data output bit 3 2) Analog composite output
186	DACVDDA		Power	3.3V power pin for VIDEO DAC circuitry
185	YUV4	Y/G	Output 4mA, SR	1) Video data output bit 4 2) Green or Y
184	DACVSSA		Ground	Ground pin for VIDEO DAC circuitry
183	YUV 5	B/Cb/Pb	Output 4mA, SR	1) Video data output bit 5 2) Blue or CB

182	YUV 6	R/Cr/Pr	Output 4mA, SR	1) Video data output bit 6 2) Red or CR
181	VSYN	V_ADIN1	Output 4mA, SR	1) Vertical sync input/output 2) While no External TV-encoder: I) Vertical sync for video-input II) Version AD input port 1 III) GPIO
180	YUV 7	INT3# ASDATA 5	Output 4mA, SR	1) Video data output bit 7 2) While no External TV-encoder: I) Microcontroller external interrupt 3 II) Audio serial data 5 part II : DSD data sub-woofer channel or Microphone output III) GPIO
179	HSYN	INT4# V_ADIN2	Output 4mA, SR	1) Horizontal sync input/output 2) While no External TV-encoder: I) Horizontal sync for video-input II) Version AD input port 2 III) GPIO IV) Microcontroller external interrupt 4
Video Interface (12)				
160	DACVDDC		Power	3.3V power pin for video DAC circuitry
161	VREF		Analog	Bandgap reference voltage
162	FS		Analog	Full scale adjustment
163	DACVSSC		Ground	Ground pin for video DAC circuitry
164	CVBS		In/Out 4mA, SR	Analog composite output
165	DACVddb		Power	3.3V power pin for video DAC circuitry
166	DACVSSB		Ground	Ground pin for video DAC circuitry
167	DACVDDA		Power	3.3V power pin for video DAC circuitry
168	Y/G		In/Out 4mA, SR	Green, Y, SY, or CVBS
169	DACVSSA		Ground	Ground pin for video DAC circuitry
170	B/CB/PB		In/Out 4mA, SR	Blue, CB/PB, or SC
171	R/CR/PR		In/Out 4mA,	Red, CR/PR, CVBS, or SY

			SR	
MISC (12)				
108	PRST#		In/Out PD,SMT	Power on reset input, active low
107	ICE		In/Out PD,SMT	Microcontroller ICE mode enable
233	XTALO		Output	27MHz crystal output
234	XTALI		Input	27MHz crystal input
46	USB_VSS		USB Ground	USB ground pin
47	USBP		Analog In/Out	USB port DPLUS analog pin
48	USBM		Analog In/Out	USB port DMINUS analog pin
49	USB_VDD3		Analog In/Out	USB Power pin 3.3V
201	GPIO3		In/Out Pull-Down	GPIO
200	GPIO4		In/Out Pull-Down	GPIO
199	RCLKB	GPIO5	In/Out Pull-Down	GPIO
198	RVREF	GPIO6	In/Out Pull-Down	GPIO
Dram Interface (58) (Sorted by position)				
176	C_0	IO_0(RD1 6)	In/Out Non-pull	1) Digital Video output C bit 0 2) GPIO
175	C_1	IO_1(RD1 7)	In/Out Non-pull	1) Digital Video output C bit 1 2) GPIO
173	C_2	IO_2(RD1 8)	In/Out Non-pull	1) Digital Video output C bit 2 2) GPIO
172	C_3	IO_3(RD1 9)	In/Out Non-pull	1) Digital Video output C bit 3 2) GPIO
171	C_4	IO_4(RD2 0)	In/Out Non-pull	1) Digital Video output C bit 4 2) GPIO
169	C_5	IO_5(RD2 1)	In/Out Non-pull	1) Digital Video output C bit 5 2) GPIO
168	C_6	IO_6(RD2 2)	In/Out Non-pull	1) Digital Video output C bit 6 2) GPIO
167	C_7	IO_7(RD2 3)	In/Out Non-pull	1) Digital Video output C bit 7 2) GPIO
177	IO_17	(DQM2)	In/Out Pull- Up	GPIO
166	YUVCLK	IO_8(DQ M3)	In/Out Pull- Up	1) Digital Video output Clock 2) GPIO

165	Y_0	IO_9(RD2 4)	In/Out Non-pull	1) Digital Video output Y bit 0 2) GPIO
164	Y_1	IO_10(RD 25)	In/Out Non-pull	1) Digital Video output Y bit 1 2) GPIO
163	Y_2	IO_11(RD 26)	In/Out Non-pull	1) Digital Video output Y bit 2 2) GPIO
162	Y_3	IO_12(RD 27)	In/Out Non-pull	1) Digital Video output Y bit 3 2) GPIO
161	Y_4	IO_13(RD 28)	In/Out Non-pull	1) Digital Video output Y bit 4 2) GPIO
159	Y_5	IO_14(RD 29)	In/Out Non-pull	1) Digital Video output Y bit 5 2) GPIO
158	Y_6	IO_15(RD 30)	In/Out Non-pull	1) Digital Video output Y bit 6 2) GPIO
157	Y_7	IO_16(RD 31)	In/Out Non-pull	1) Digital Video output Y bit 7 2) GPIO
155	RA4		In/Out	DRAM address 4
154	RA5		In/Out	DRAM address 5
153	RA6		In/Out	DRAM address 6
152	RA7		In/Out	DRAM address 7
151	RA8		In/Out	DRAM address 8
150	RA9		In/Out	DRAM address 9
149	RA11		In/Out	DRAM address bit 11
147	CKE		In/Out Pull-Down	DRAM clock enable
146	RCLK		In/Out	Dram clock
144	RA3		In/Out	DRAM address 3
143	RA2		In/Out	DRAM address 2
141	RA1		In/Out	DRAM address 1
140	RA0		In/Out	DRAM address 0
139	RA10		In/Out	DRAM address 10
138	BA1		In/Out	DRAM bank address 1
137	BA0		In/Out	DRAM bank address 0
136	RCS#		output	DRAM chip select, active low
135	RAS#		output	DRAM row address strobe, active low
134	CAS#		output	DRAM column address strobe, active low

133	RWE#		output	DRAM Write enable, active low
132	DQM1		In/Out	Data mask 1
130	IO_18	(DQS1)	In/Out Non-pull	GPIO
129	RD8		In/Out	DRAM data 8
128	RD9		In/Out	DRAM data 9
127	RD10		In/Out	DRAM data 10
126	RD11		In/Out	DRAM data 11
125	RD12		In/Out	DRAM data 12
124	RD13		In/Out	DRAM data 13
123	RD14		In/Out	DRAM data 14
125	RD15		In/Out	DRAM data 15
121	RD0		In/Out	DRAM data 0
120	RD1		In/Out	DRAM data 1
119	RD2		In/Out	DRAM data 2
117	RD3		In/Out	DRAM data 3
116	RD4		In/Out	DRAM data 4
115	RD5		In/Out	DRAM data 5
114	RD6		In/Out	DRAM data 6
113	RD7		In/Out	DRAM data 7
112	IO_19	(DQS0)	In/Out	GPIO
111	DQM0		In/Out Non-pull	Data mask 0
JTAG Interface(4)				
51	TDI	V_ADIN4	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 4 3) GPIO
52	TMS	V_ADIN5	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 5 3) GPIO
53	TCK	V_ADIN6	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 6 3) GPIO
54	TDO	V_ADIN7	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 7 3) GPIO

3.5.2 function introduction to AT24C02

1. Description

The AT24C02 provides 2048 bits of serial electrically erasable and programmable read-only memory (EEPROM) organized as 256 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operation are essential. The AT24C02 is available in space-saving 8-lead PDIP,

8-lead MAP, 8 lead TSSOP and 8-ball dBG2 packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 2.7V (2.7V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

2. Features

Low-voltage and Standard-voltage Operation

– 2.7 (VCC = 2.7V to 5.5V)

– 1.8 (VCC = 1.8V to 5.5V)

Internally Organized, 256 x 8 (2K),

2-wire Serial Interface

Schmitt Trigger, Filtered Inputs for Noise Suppression

Bi-directional Data Transfer Protocol

100 kHz (1.8V) and 400 kHz (2.5V, 2.7V, 5V) Compatibility

Write Protect Pin for Hardware Data Protection

8-byte Page (1K, 2K), Write Modes

Partial Page Writes are Allowed

Self-timed Write Cycle (5 ms max)

High-reliability

– Endurance: 1 Million Write Cycles

– Data Retention: 100 Years

Automotive Grade, Extended Temperature and Lead-Free Devices Available

8-lead PDIP, 8-lead JEDEC SOIC, 8-lead MAP, 5-lead SOT23,

8-lead TSSOP and 8-ball dBG2™ Packages

3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	A0	I	To Ground
2	A1	I	To Ground
3	A2	I	To Ground
4	VSS	I	To Ground
5	SDA	I/O	Serial Data input

6	SCL	I/O	Serial SCL input
7	TEST	I/O	Test port
8	VDD	I	Positive Power Supply

3.5.3 function introduction to CS5340

1. Description

The CS5340 is a complete analog-to-digital converter for digital audio systems. It performs sampling, analog-to-digital conversion and anti-alias filtering, generating 24-bit values for both left and right inputs in serial form at sample rates up to 200kHz per channel.

The CS5340 uses a 5th-order, multi-bit Delta-Sigma modulator followed by digital filtering and decimation, which remove the need for an external anti-alias filter.

The CS5340 is ideal for audio systems requiring wide dynamic range, negligible distortion and low noise, such as set-top boxes, DVD-karaoke players, DCD recorders, A/V receivers, and automotive applications.

2. Features

Advanced multi-bit Delta-Sigma architecture

24-bit conversion

Supports all audio sample rates including 192 kHz

101dB Dynamic Range at 5V

–94 dB THD+N

High pass filter to remove DC offsets

Analog/digital core supplies from 3.3V to 5V

Supports logic levels between 2.5V and 5V

Linear phase digital anti-alias filtering

Auto-mode selection

Pin compatible with the CS5431

3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1, 16	M0, M1	I	Mode Selection
2	MCLK	I	Master Clock
3	VL	I	Logic Power
4	SDOUT	O	Serial Audio Data Output
5, 14	GND	I	Ground
6	VD	I	Digital Power

7	SCLK	I/O	Serial Clock
8	LRCK	I/O	Left Right Clock
9	/RST	I	Reset
10, 12	AINL, AINR	I	Analog Input
11	VQ	O	Quiescent Voltage
13	VA	I	Analog Power
15	FILT+	O	Positive Voltage Reference

3.5.4 function introduction to 29LV160BE

The 29LV160BE is a 16Mbit FLASH memorizer, and the damage of U214 may cause troubles, such as power not on, no disc reading and power on picture mosaic. Pin function is shown as the following table:

Pin	Name	Function	Voltage (when no disc)	Data direction
1-9, 16-25, 48	AO-A19	20 bit address bus		I
11	WE	Write enable signal, low level is effective	3.23V	I
12	RESET	Reset, low level is effective	3.23V	I
10, 13, 14	NC	Blank pin		
15	RY/BY	Ready/system busy	3.23V	O
26	CE	Chip enable, low level effective	0V	I
27, 46	VSS	Ground		
28	OE	Output enable signal , low level is effective	0V	I
29-3, 6, 38-44	DQ0-DQ14	15 bit data bus		O
37	VCC	5V power supply	+5V	
45	DQ15/A-1	Take word extend mode as data line, and bit extend mode as address line		I/O
47	BYTE	Select 8-bit or 16-bit output mode. High level is 16-bit output and low level is 8-bit output		I

3.5.5 function introduction to HY57V641620HGT-7

64M 16-bit memorizer SDRAM with the player and the working clock frequency is 166/143MHZ. The function of 16SDRAM in DVD players is to memorizer the program of AML3298 taken out from FLASH and information of image and sound taken out from disc to form buffer, add the stability of information output and add anti-shaking effect of player. Pin function introduction is shown as the following table:

Pin	Name	Function	Signal flow	Pin	Name	Function	Signal flow
1	VDD	3.3V power supply		28	VSS	Ground	
2	DQ0	Data bus	I/O	29	MA4	Address bus	I
3	VDDQ	3.3V power supply	I/O	30	MA5	Address bus	I
4	DQ1	Data bus	I/O	31	MA6	Address bus	I
5	DQ2	Data bus	I/O	32	MA7	Address bus	I
6	VSSQ	Ground		33	MA8	Address bus	I
7	DQ3	Data bus	I/O	34	MA9	Address bus	I
8	DQ4	Data bus	I/O	35	MA11	Address bus	I
9	VDDQ	3.3V power supply		36	NC	Blank	
10	DQ5	Data bus	I/O	37	CKE	Clock enable signal	I
11	DQ6	Data bus	I/O	38	CLK	System clock input	I
12	VSSQ	Ground		39	UDQM	Data input/output screen-shielded signal	I
13	DQ7	Data bus	I/O	40	NC	Blank	
14	VDD	3.3V power supply		41	VSS	Ground	
15	LDQM	Data input/output screen-shielded signal	I	42	DQ8	Data bus	I/O
16	WE	Write control signal	I	43	VDDQ	3.3V power supply	
17	CAS	Line address gating signal	I	44	DQ9	Data bus	I/O
18	RAS	Row address gating signal	I	45	DQ10	Data bus	I/O
19	CS	Chip selection signal	I	46	VSSQ	Ground	
20	SD-BS0	Segment address 0 gating signal	I	47	DQ11	Data bus	I/O
21	SD-BS1	Segment address 1 gating signal	I	48	DQ12	Data bus	I/O
22	MA10	Address bus	I	49	VDDQ	3.3V power supply	
23	MA0	Address bus	I	50	DQ13	Data bus	I/O
24	MA1	Address bus	I	51	DQ14	Data bus	I/O
25	MA2	Address bus	I	52	VSSQ	Ground	
26	MA3	Address bus	I	53	DQ15	Data bus	I/O
27	VDD	3.3V power supply		54	VSS	Ground	

3.5.6 function introduction to 4580

1. Description

The 4580 is the dual operational amplifier, specially designed for improving the tone control, which is most suitable for the audio application.

Featuring noiseless, higher gain bandwidth, high output current and low distortion ratio, and it is most suitable not only for acoustic electronic parts of audio pre-amp and active filter, but also for the industrial measurement tools. It is also suitable for the head phone amp at higher output current, and further more, it can be applied for the handy type set operational amplifier of general purpose in application of low voltage single supply type which is properly biased of the low voltage source.

2. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	A Output	O	A Output
2	A Input-	I	A Input-
3	A Input+	I	A Input+
4	V-	I	Supply Voltage -
5	B Input+	I	B Input+
6	B Input-	I	B Input-
7	BOutput	O	BOutput
8	V+	I	Supply Voltage +

3.5.7 function introduction to AM5888S

1. Description

The AM5888S is a five-channel BTL driver IC for driving the motors and actuators such as used in DVD player and consists of two independent precision voltage regulators with adjustable range from 1.5V to 4 V. It supports a variety of applications. Also, Pb free package is selectable (Please refer to Marking Identification).

2. Fetures

Two channels are voltage-type BTL drivers for actuators of tracking and focus. Two channels are voltage-type BTL driver for sled and spindle motors. It is also built-in one channel bi-direction DC motor driver for tray.

Wide dynamic range [9.0V (*typ.*) when $V_{cc1}=V_{cc2}=12V$, at $R_L=20\Omega$, load].

Separating power of V_{cc1} and V_{cc2} is to improve power efficiency by a low supply voltage for tracking, focus, and spindle.

Level shift circuit built-in.

Thermal shut down circuit built-in.

Mute mode built-in.

Dual actuator drivers:

A general purpose input OP provides differential input for signal addition. The output structure is two power OPAMPS in bridge configuration.

Sled motor driver: A general purpose input OP provides differential input for signal addition. The output structure is one power OPAMP in bridge configuration.

Spindle driver: Single input linear BTL driver. The output structure are two power OPAMPS in bridge configuration.

Tray in-out driver: The DC motor driver supports forward/reverse control for tray motor.

2 Built-in regulator controllers: Adjustable range 1.5V ~ 4V

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	VINFC	I	Input for focus drive
2	TRB_1	O	Connect to external transistor base
3	REGO2	O	Regulator voltage output, connect to external transistor collector
4	VINSL	I	Input for the sled driver
5	REGO1	O	Regulator voltage output, connect to external transistor collector
6	FWD	I	Tray driver forward input
7	REV	I	Tray driver reverse input
8	VCC1	I	Vcc for pre-drive block and power block of sled and tray
9	VOTR-	O	Tray driver output (-)
10	VOTR+	O	Tray driver output (+)
11	VOSL+	O	Sled driver output (+)
12	VOSL-	O	Sled driver output (-)
13	VOFC-	O	Focus driver output (-)
14	VOFC+	O	Focus driver output (+)
15	VOTK+	O	Tracking driver output (+)
16	VOTK-	O	Tracking driver output (-)
17	VOLD+	O	Spindle driver output (+)
18	VOLD-	O	Spindle driver output (-)
19	VCC2	I	Vcc for power block of spindle, tracking and focus
20	NC		No Connection

21	VCTL	I	Speed control input of tray driver
22	GND	I	Ground
23	VINLD	I	Input for spindle driver
24	NC		No Connection
25	TRB_2	O	Connect to external transistor base
26	VINTK	I	Input for tracking driver
27	BIAS	I	Input for reference voltage
28	MUTE	I	Input for mute control

3.5.8 function introduction to V6312A

1. DESCRIPTION

The V6312A is a FIP (fluorescent Indicator Panel, or Vacuum Fluorescent Display) controller/driver that is driven on a 1/4- to 1/11 duty factor. It consists of 11 segment output lines, 6 grid output lines, 5 segment/grid output drive lines, a display memory, a control circuit, and a key scan circuit. Serial data is input to the V6312A through a three-line serial interface. This FIP controller/driver is ideal as a peripheral device for a single-chip microcomputer.

2. FEATURES

Multiple display modes (11-segment & 11-digit to 16-segment & 4-digit)

Key scanning (6 _ 4 matrix)

Dimming circuit (eight steps)

High-voltage output (VDD _ 35 V max)

LED ports (4 chs., 20 mA max)

General-purpose input port (4 bits)

No external resistors necessary for driver outputs (P-ch open-drain + pull-down resistor output)

Serial interface (CLK, STB, DIN, DOUT)

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
6	DIN	I	Data input
5	DOUT	O	Data output
9	STB		Strobe
8	CLK	I	Clock input
44	OSC	n	Oscillator pin
15 to 20	Seg1/KS1 to Seg6/KS6	O	High-voltage output

21 to 25	Seg7 to Seg11	O	High-voltage output (segment)
37 to 32	Grid1 to Grid6	O	High-voltage output (grid)
26, 28 to 31	Seg12/Grid11 to Seg16/Grid7	O	High-voltage output (segment/grid)
42 to 39	LED1 to LED4	O	LED output
10 to 13	KEY1 to KEY4	I	Key data input
1 to 4	SW1 to SW4	I	Switch input
14, 38	VDD	I	Logic power
7, 43	VSS		Logic ground
27	VEE		Pull-down level

3.5.9 function introduction to VIPER22A

1. DESCRIPTION

The VIPer22A combines a dedicated current mode PWM controller with a high voltage Power MOSFET on the same silicon chip. Typical applications cover off line power supplies for battery charger adapters, standby power supplies for TV or monitors, auxiliary supplies for motor control, etc. The internal control circuit offers the following benefits:

- Large input voltage range on the VDD pin accommodates changes in auxiliary supply voltage. This feature is well adapted to battery charger adapter configurations.
- Automatic burst mode in low load condition.
- Overvoltage protection in hiccup mode.

2. FEATURES

FIXED 60 KHZ SWITCHING FREQUENCY

9V TO 38V WIDE RANGE VDD VOLTAGE

CURRENT MODE CONTROL

AUXILIARY UNDERVOLTAGE LOCKOUT WITH HYSTERESIS

HIGH VOLTAGE START UP CURRENT SOURCE

OVERTEMPERATURE, OVERCURRENT AND OVERVOLTAGE PROTECTION WITH
AUTORESTART

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	SOURCE	O	Power MOSFET source and circuit ground reference.

2	SOURCE	O	Power MOSFET source and circuit ground reference.
3	FB	I	Feedback input.
4	VDD	I	Power supply of the control circuits.
5	DRAIN	I	Power MOSFET drain.
6	DRAIN	I	Power MOSFET drain.
7	DRAIN	I	Power MOSFET drain.
8	DRAIN	I	Power MOSFET drain.

3.5.10 function introduction to HS817

U502 (HS817) is a photoelectric coupler, shown as the figure 3.5.10.1. The right side is a light emitting diode, which sends out light of different intensity according to the strength of voltage inputted from the right side, generates photocurrent of different intensity on the left side according to light of different intensity, and outputs from position D. The higher of the voltage inputted from the right side, the stronger of the light emitted from light emitting diode and the larger of the photocurrent produced from position D. The lower of the voltage inputted from the right side of photoelectric coupler, the weaker of the light emitted from light emitting diode and the weaker of the current outputted from position D.

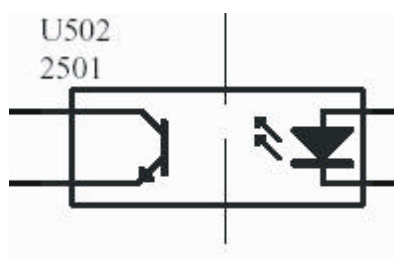


Figure 3.5.10.1 HS817 outside drawing

3.5.11 function introduction to AZ1086

The LT1086 is designed to provide up to 1.5A output current. shown as the figure 3.5.11.1. All internal circuitry is designed to operate down to 1V input-to-output differential and the dropout voltage is fully specified as a function of load current. Dropout is guaranteed at several operating points up to a maximum of 1.5V at maximum output current. Dropout decreases at lower load currents. On-chip trimming adjusts the reference/output voltage to 1%. Current limit is also trimmed, minimizing the stress on both the regulator and power source circuitry under overload conditions.

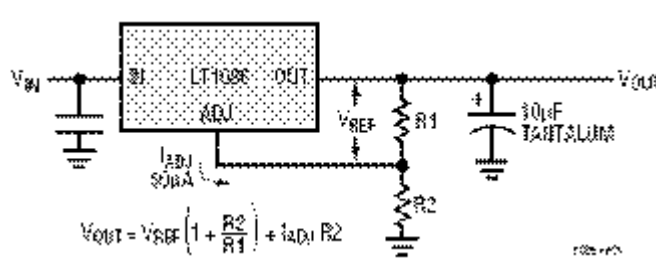


Figure 3.5.11.1 AZ1086 outside drawing

3.5.12 function introduction to LM431A

U503 (LM431A) is a 2.5V comparator, shown as the figure 3.4.12.1. Compared the inputted voltage of R end with 2.5V, when voltage of R end is more than 2.5V, KA end is on and photoelectric coupler starts to send out photocurrent; when voltage of R end is less than 2.5V, KA end is cutoff and photoelectric coupler does not send out photocurrent. CPU+3.3V in power board circuit must be kept in 3.3V, for the function of comparator. No matter more than or less than 3.3V, through on and off status of comparator, it will control the on state of the output end of photoelectric coupler LM431A to adjust the output space occupation ratio of switch module to control the output voltage of transformer and masthead the power.

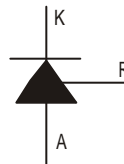


Figure 3.5.12.1 LM431A outside drawing

3.5.13 function introduction to 4558

1. Description

The RC4558 and RM4558 devices are dual general-purpose operational amplifiers with each half electrically similar to the A741 except that offset null capability is not provided.

The high common-mode input voltage range and the absence of latch-up make these amplifiers ideal for voltage-follower applications. The devices are short-circuit protected and the internal frequency compensation ensures stability without external components.

The RC4558 is characterized for operation from 0° C to 70° C, and the RM4558 is characterized for operation over the full military temperature range of -55 C to 125 C.

2. FEATURES

Continuous-Short-Circuit Protection

Wide Common-Mode and Differential

Voltage Ranges

No Frequency Compensation Required

Low Power Consumption

No Latch-Up

Unity-Gain Bandwidth . . . 3 MHz Typ

Gain and Phase Match Between Amplifiers

Low Noise . . . 8 nV/√Hz Typ at 1 kHz

Designed To Be Interchangeable With

Raytheon RC4558 and RM4558 Devices

3. PIN CONFIGURATION

PIN No	Symbol	I/O	Description
1	1OUT	O	Output 1
2	1IN–	I	Inverting Input Pin 1
3	1IN+	I	Non-Inverting Input Pin 1
PIN No.	Symbol	I/O	Description
PIN No.	Symbol	I/O	Description
4	VCC–	I	Negative Power Supply
5	2IN+	I	Non-Inverting Input Pin 2
6	2IN–	I	Inverting Input Pin 2
7	2OUT	O	Output 2
8	VCC+	I	Positive Power Supply

3.5.14 function introduction to TDA1308

1. DESCRIPTION

The TDA1308; TDA1308A is an integrated class AB stereo headphone driver contained in an SO8, DIP8 or a TSSOP8 plastic package. The device is fabricated in a 1 mm CMOS process and has been primarily developed for portable digital audio applications.

The difference between the TDA1308 and the TDA1308A is that the TDA1308A can be used at low supply voltages.

2. FEATURES

Wide temperature range

? No switch ON/OFF clicks

? Excellent power supply ripple rejection

? Low power consumption

Short-circuit resistant

? High performance

– high signal-to-noise ratio

– high slew rate

– low distortion

? Large output voltage swing.

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	OUTA	O	output A
2	INA(neg)	I	inverting input A
3	INA(pos)	I	non-inverting input A
4	VSS	I	negative supply
PIN	Symbol	I/O	Description
5	INB(pos)	I	non-inverting input B
6	INB(neg)	I	inverting input B
7	OUTB	O	output B
8	VDD	I	positive supply

3.5.15 function introduction to PT6961

1. DESCRIPTION

PT6961 is an LED Controller driven on a 1/7 to 1/8 duty factor. Eleven segment output lines, six grid output lines, 1 segment/grid output lines, one display memory, control circuit, key scan circuit are all incorporated into a single chip to build a highly reliable peripheral device for a single chip microcomputer. Serial data is fed to PT6961 via a four-line serial interface. Housed in a 32-pin SO Package, PT6961 pin assignments and application circuit are optimized for easy PCB Lay out and cost saving advantages.

2. FEATURES

CMOS Technology

Low Power Consumption

Multiple Display Modes (12 segment, 6 Grid to 11 segment, 7 Grid)

Key Scanning (10 x 3 Matrix)

8-Step Dimming Circuitry

Serial Interface for Clock, Data Input, Data Output, Strobe Pins

Available in 32-pin, SOP Package

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	OSC	I	Oscillator Input P in
2	DOUT	O	Data output
3	DIN	I	Data input
4	CLK	I	Clock input
5	STB	I	Serial interface strobe
6	K1	I	Key data input
7	K2	I	Key data input
8	K3	I	Key data input
9	VDD	I	Power supply
10	SG1/KS1	O	Segment output
11	SG2/KS2	O	Segment output
12	SG3/KS3	O	Segment output
13	NC		
14	SG4/KS4	O	Segment output
15	SG5/KS5	O	Segment output
16	SG6/KS6	O	Segment output
17	SG7/KS7	O	Segment output
18	SG8/KS8	O	Segment output
19	SG9/KS9	O	Segment output
20	SG10/KS10	O	Segment output
21	SG11	O	Segment output
22	SG12/GR7	O	Segment output
23	GR6	O	Grid output
24	GR5	O	Grid output
25	VDD	I	Power input
26	GND	I	Ground

27	GR4	O	Grid output
28	GR3	O	Grid output
29	GND	I	Ground
30	GR2	O	Grid output
31	GR1	O	Grid output
32	GND	I	Ground

3.5.16 function introduction to LM1117

1. Description

The LM1117 series of adjustable and fixed voltage regulators are designed to provide 1A output current and to operate down to 1V input-to-output differential. The dropout voltage of the device is guaranteed maximum 1.3V at maximum output current, decreasing at lower load currents.

On-chip trimming adjusts the reference voltage to within 1% accuracy. Current limit is also trimmed, minimizing the stress under overload conditions on both the regulator and power source circuitry.

The LM1117 devices are pin compatible with other three-terminal SCS regulators and are offered in the low profile surface mount SOT-223 package and in the TO-252 (DPAK) plastic package.

2. Features

Three Terminal Adjustable or Fixed Voltages 1.5V, 1.8V, 2.5V, 2.85V, 3.3V and 5.0V

Output Current of 1A

Operates Down to 1V Dropout

Line Regulation: 0.2% Max.

Load Regulation: 0.4% Max.

SOT-223 and TO-252 package available

3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	GND/adjust	I	Ground (fixed)/adjust (adjustable)
2	Vout	O	Voltage output
3	Vin	I	Voltage input

Chapter Four

Disassembly and Assembly Process

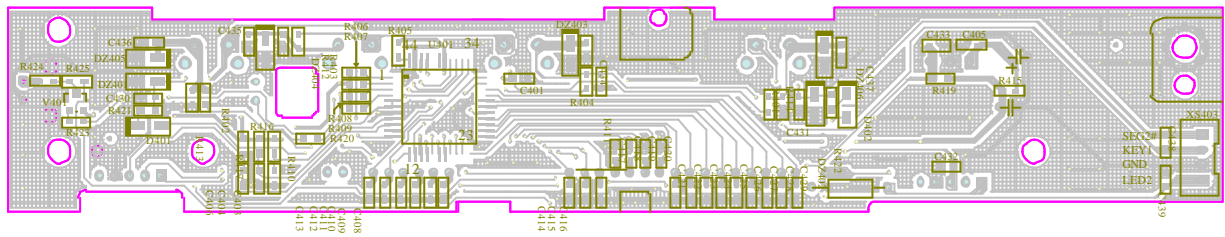
DVD players manufactured in BBK are largely identical but with minor differences and are mainly composed of loader components, control panel components, decode and servo board components, power board components, power amplifier board components, MIC board components and AV board components. In order to speed up the compilation of “Service Manual”, we shall not give repeat explanation to model with minor differences in chapter four “Disassembly and Assembly Process” for the later compiled service manuals. For disassembly and assembly process in this chapter, please refer to chapter 4 of “DK1005S Service Manual” or “DK1020S Service” .

The pictures of this model are shown as follows:

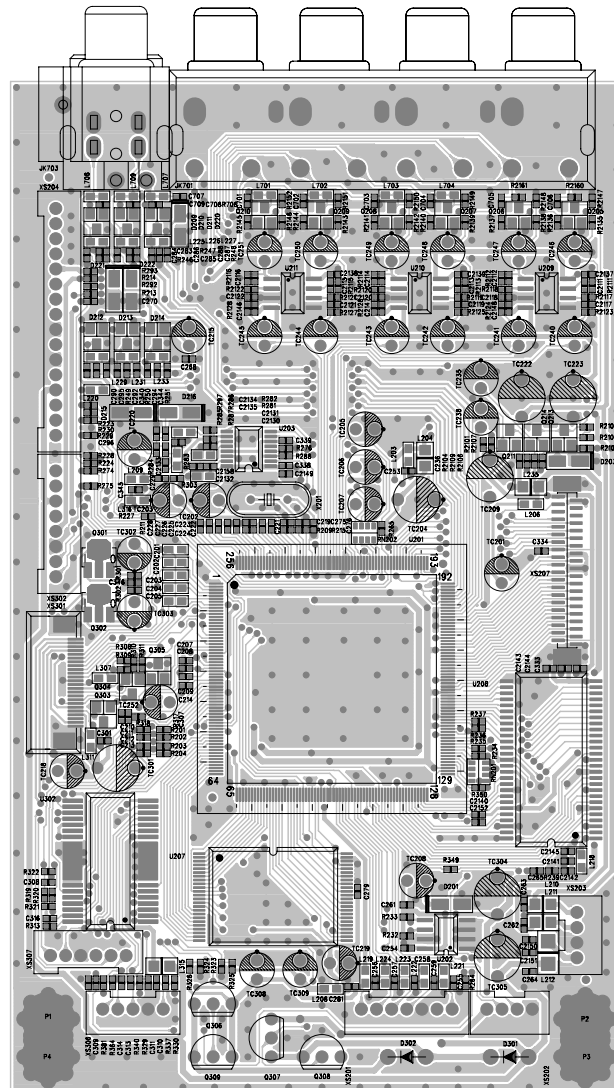


Section One PCB board

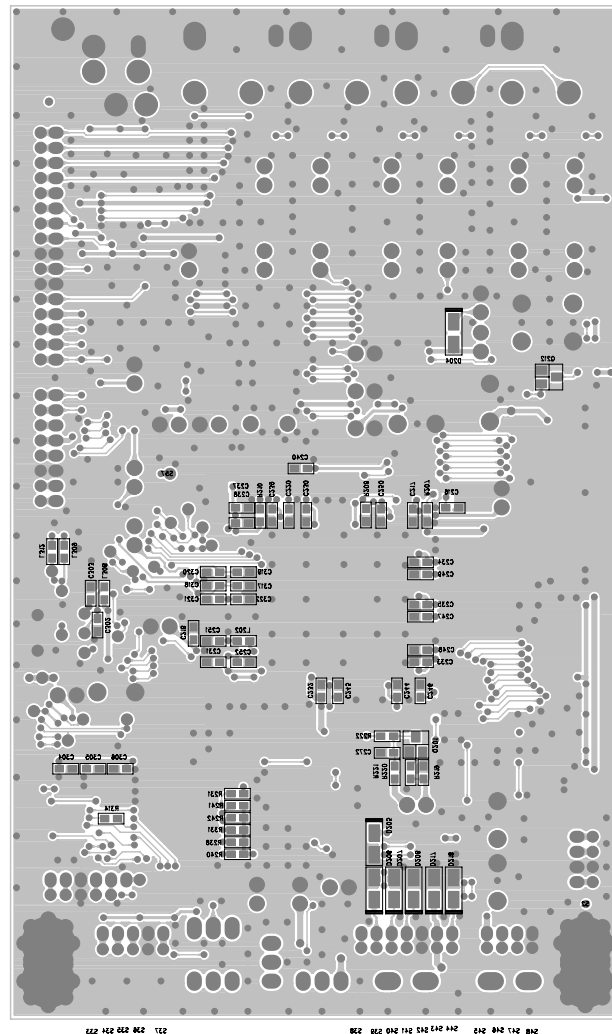
5.1.2 Bottom layer of KEY SCAN Board



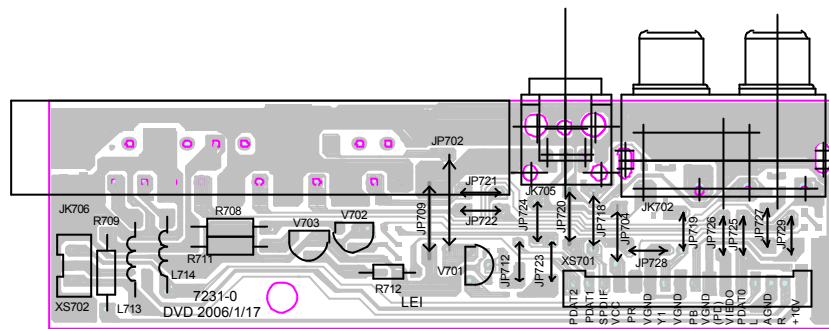
5.1.3 Surface layer of DECODE&SERVO Board



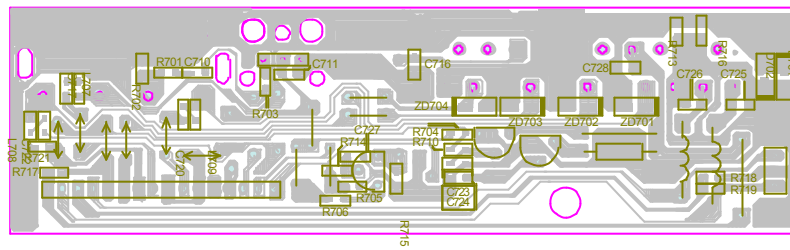
5.1.4 Bottom layer of DECODE&SERVO Board



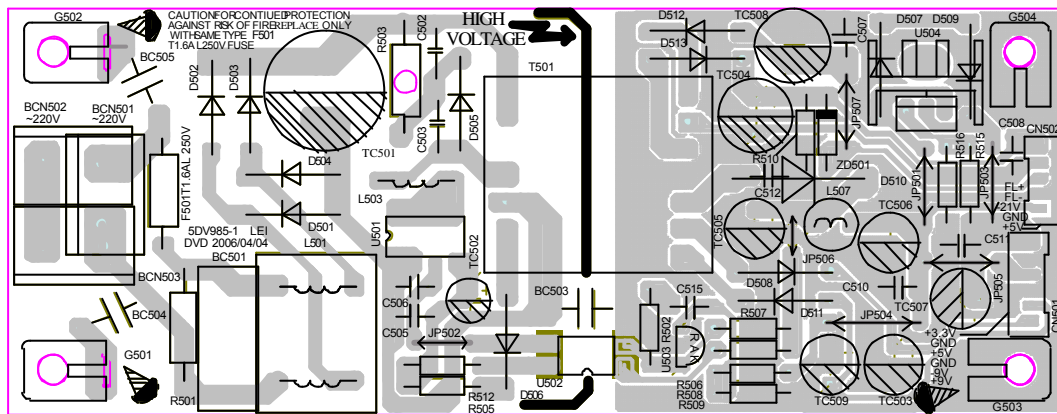
5.1.5 Surface layer of AV Board

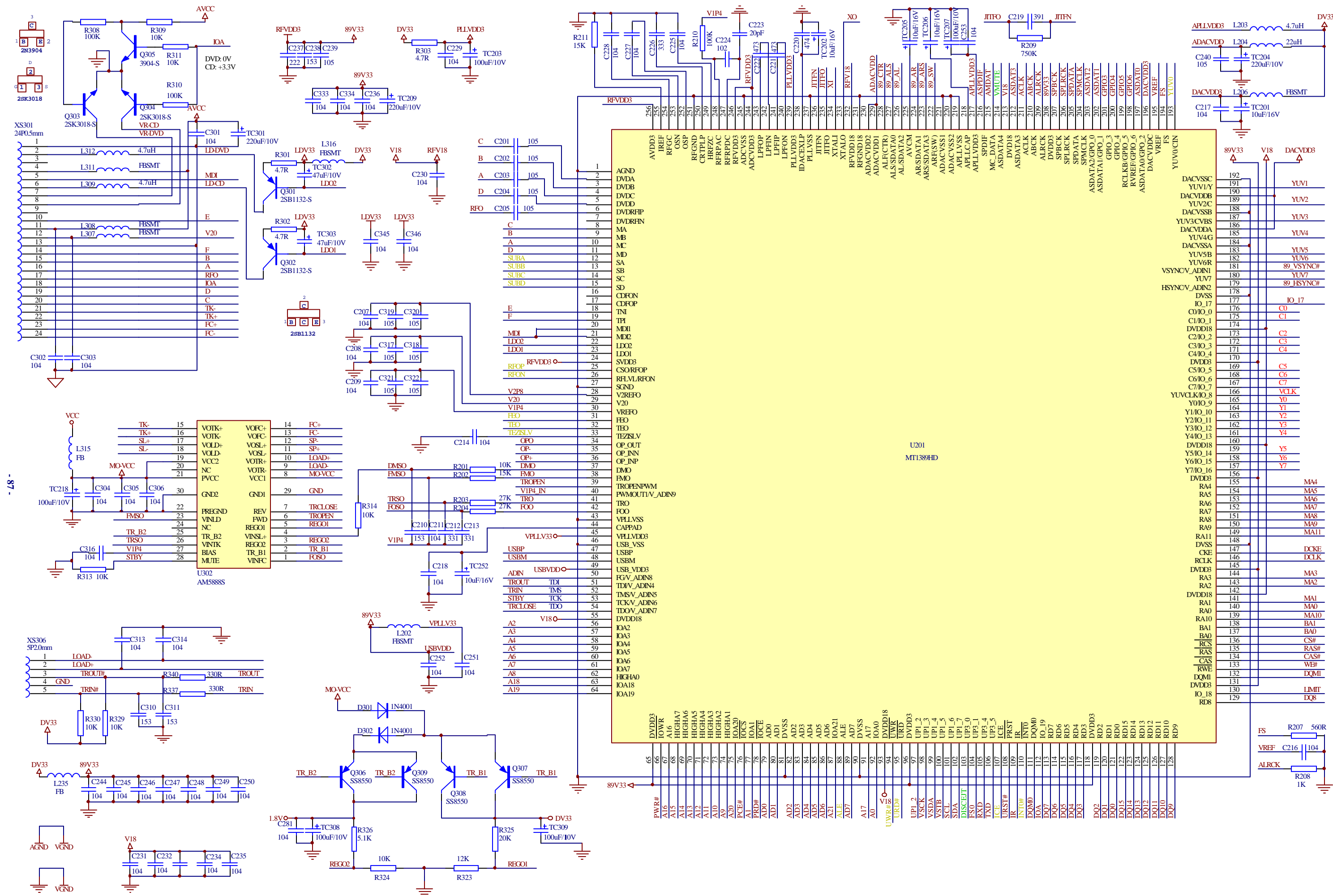


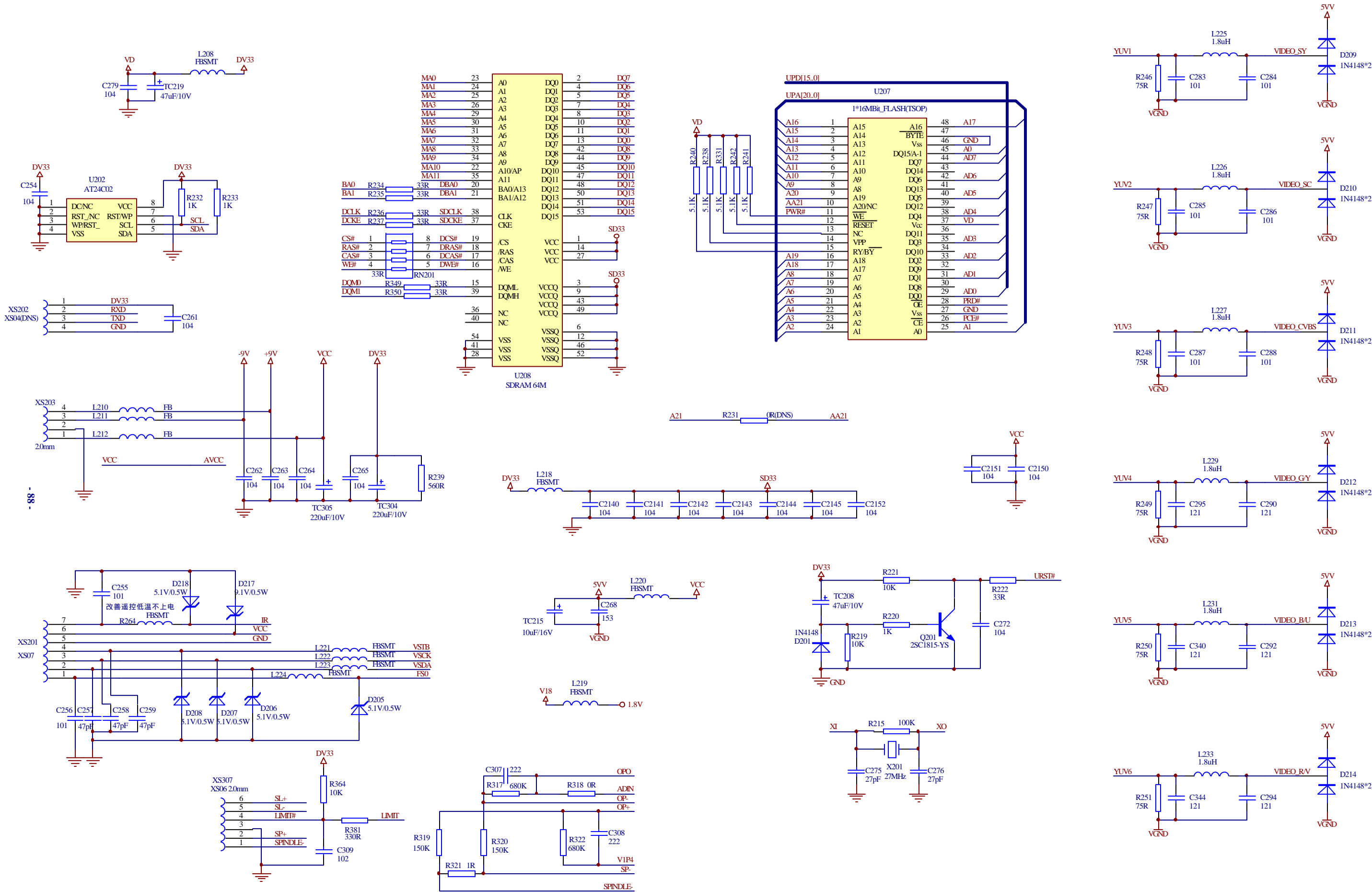
5.1.6 Bottom layer of AV Board

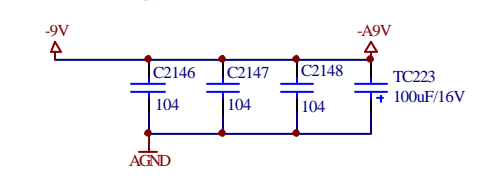
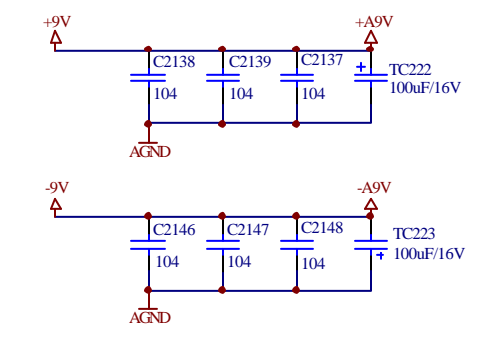
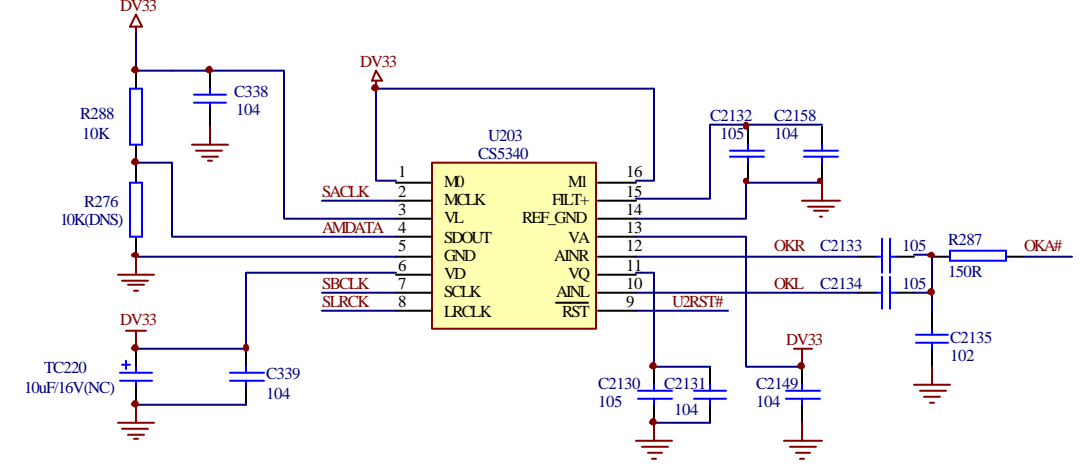
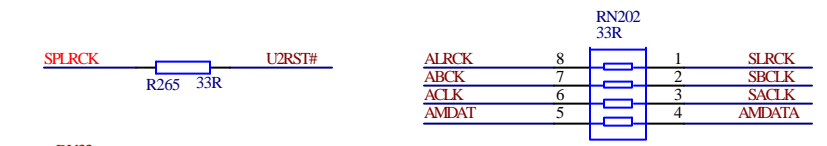
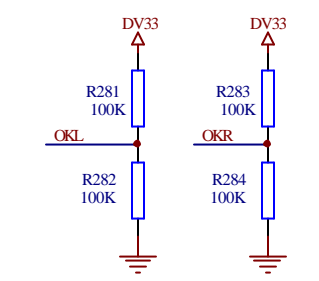
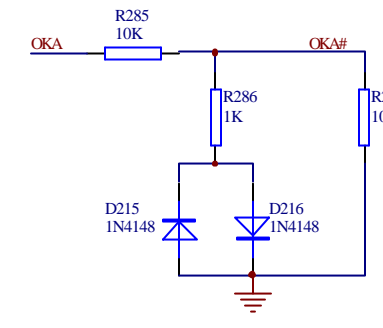
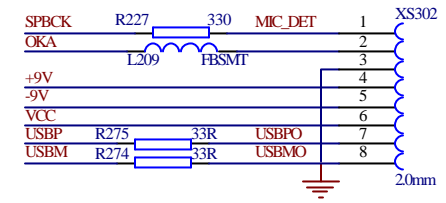
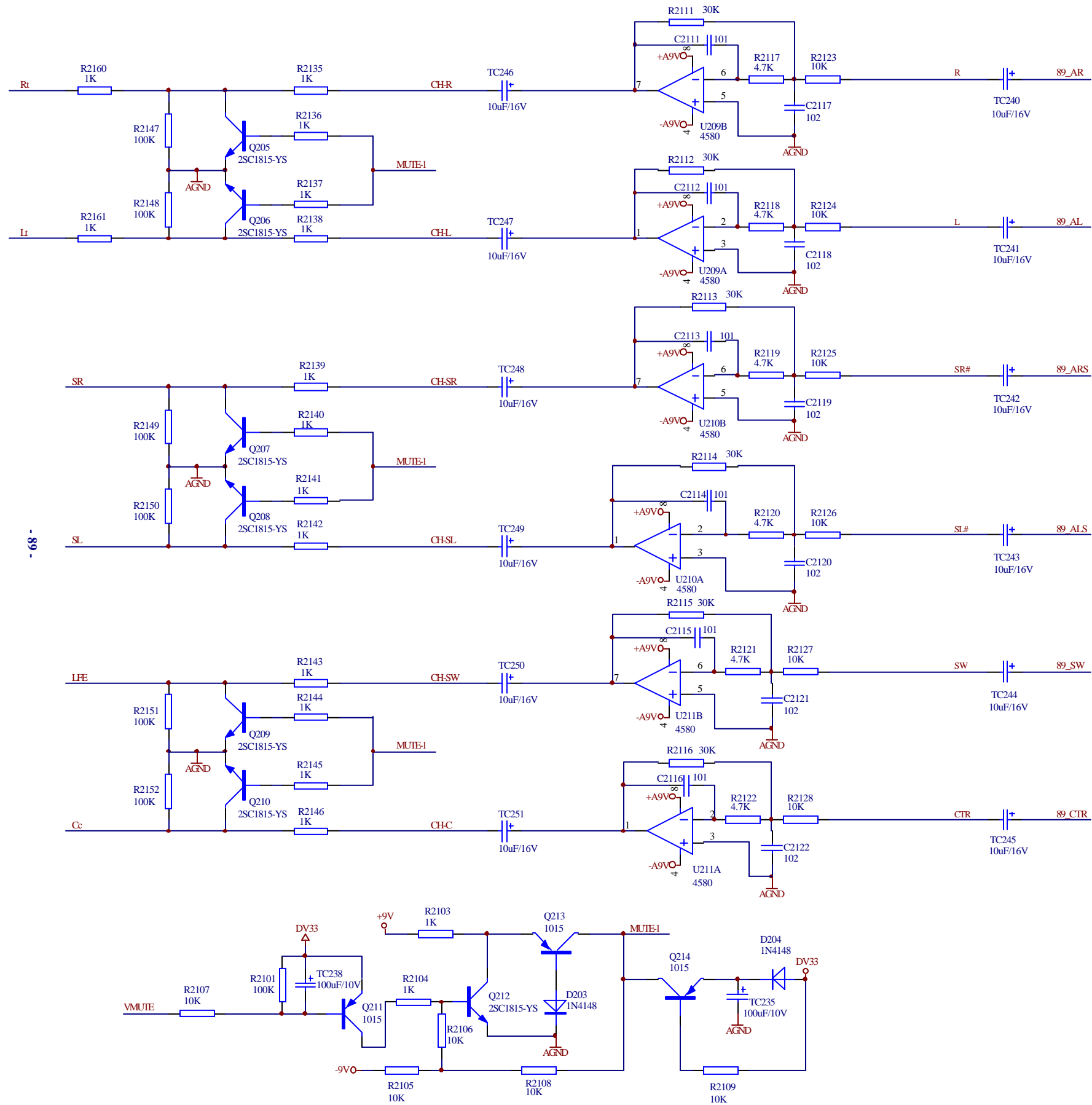


5.1.7 POWER Board



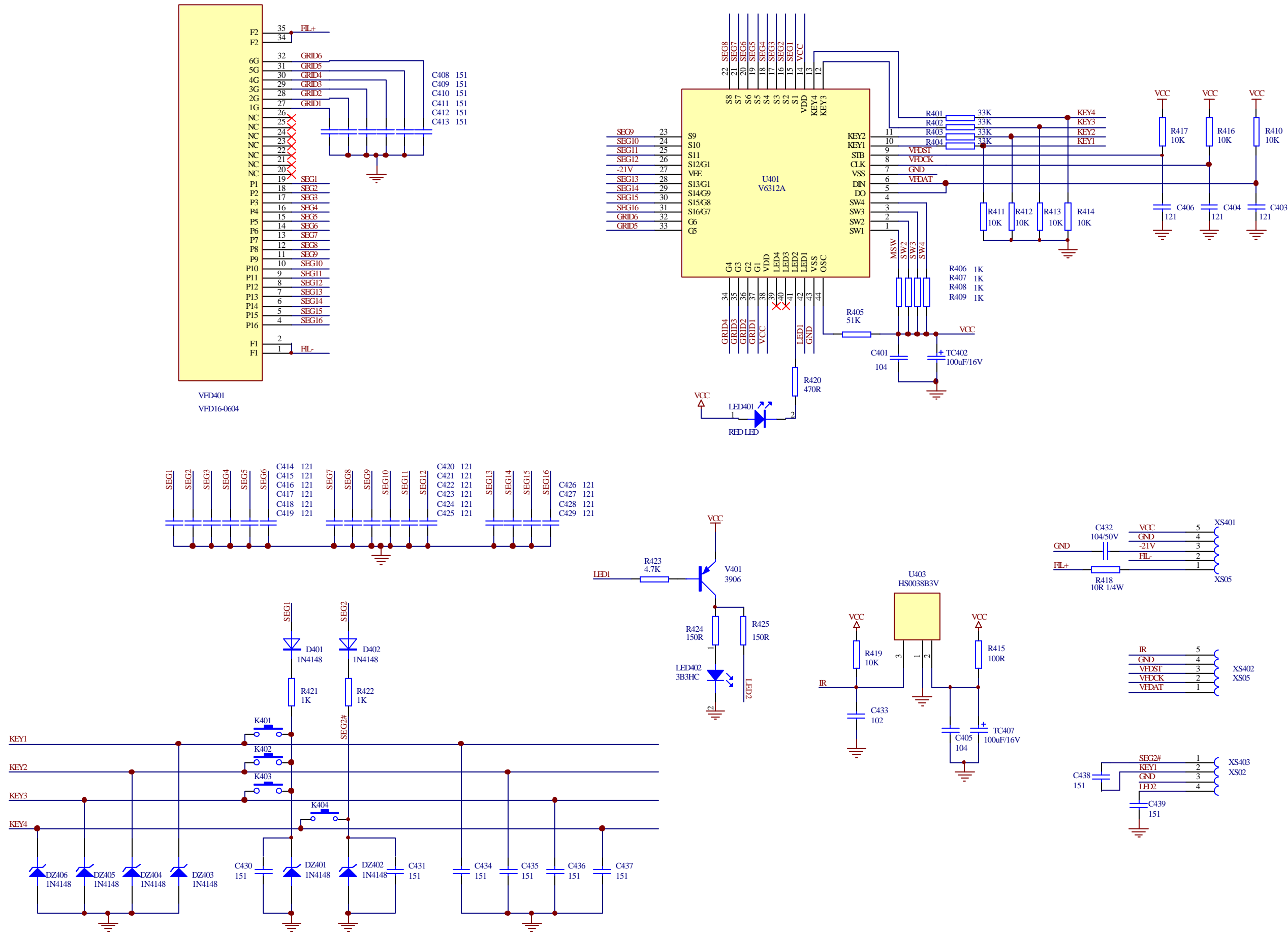


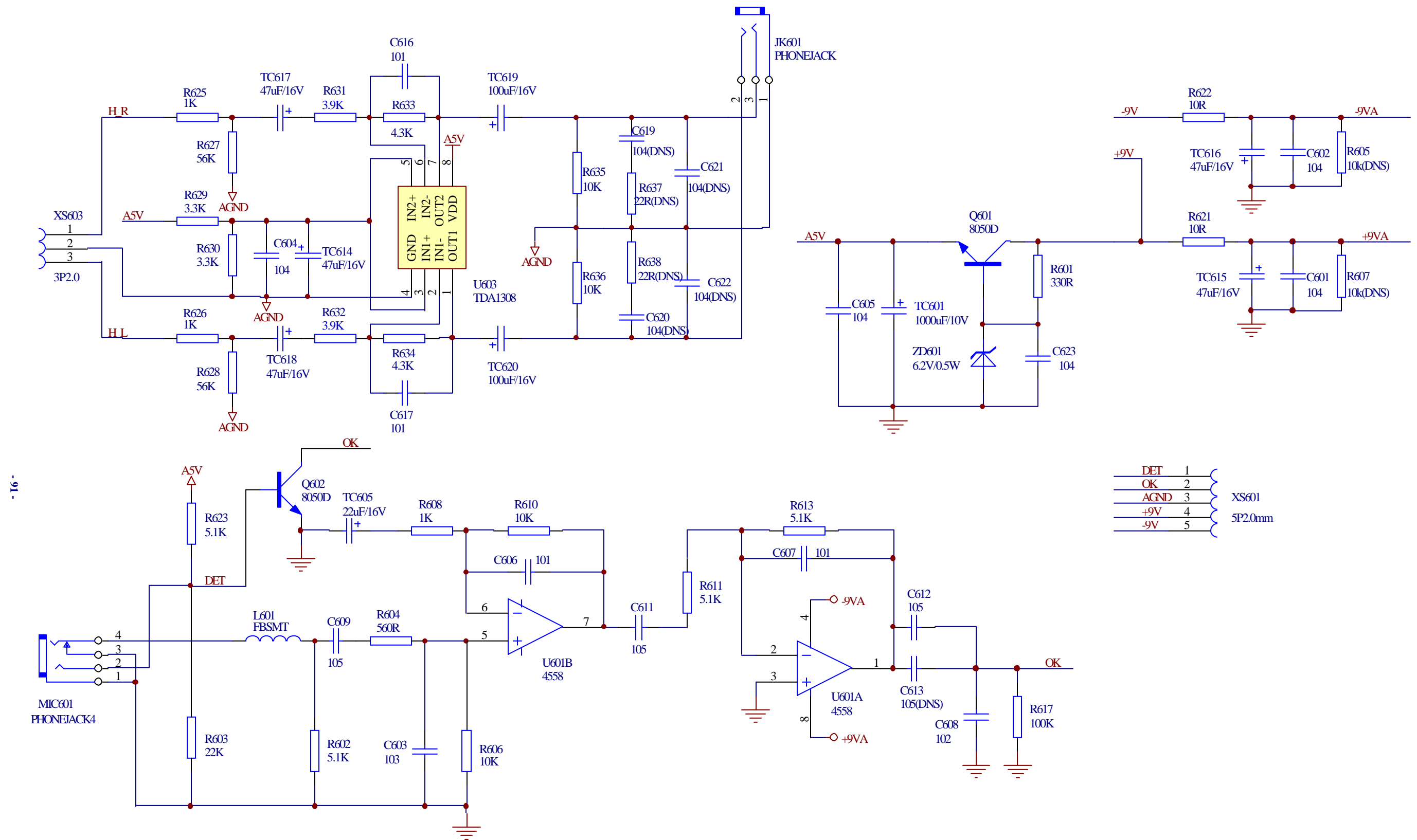


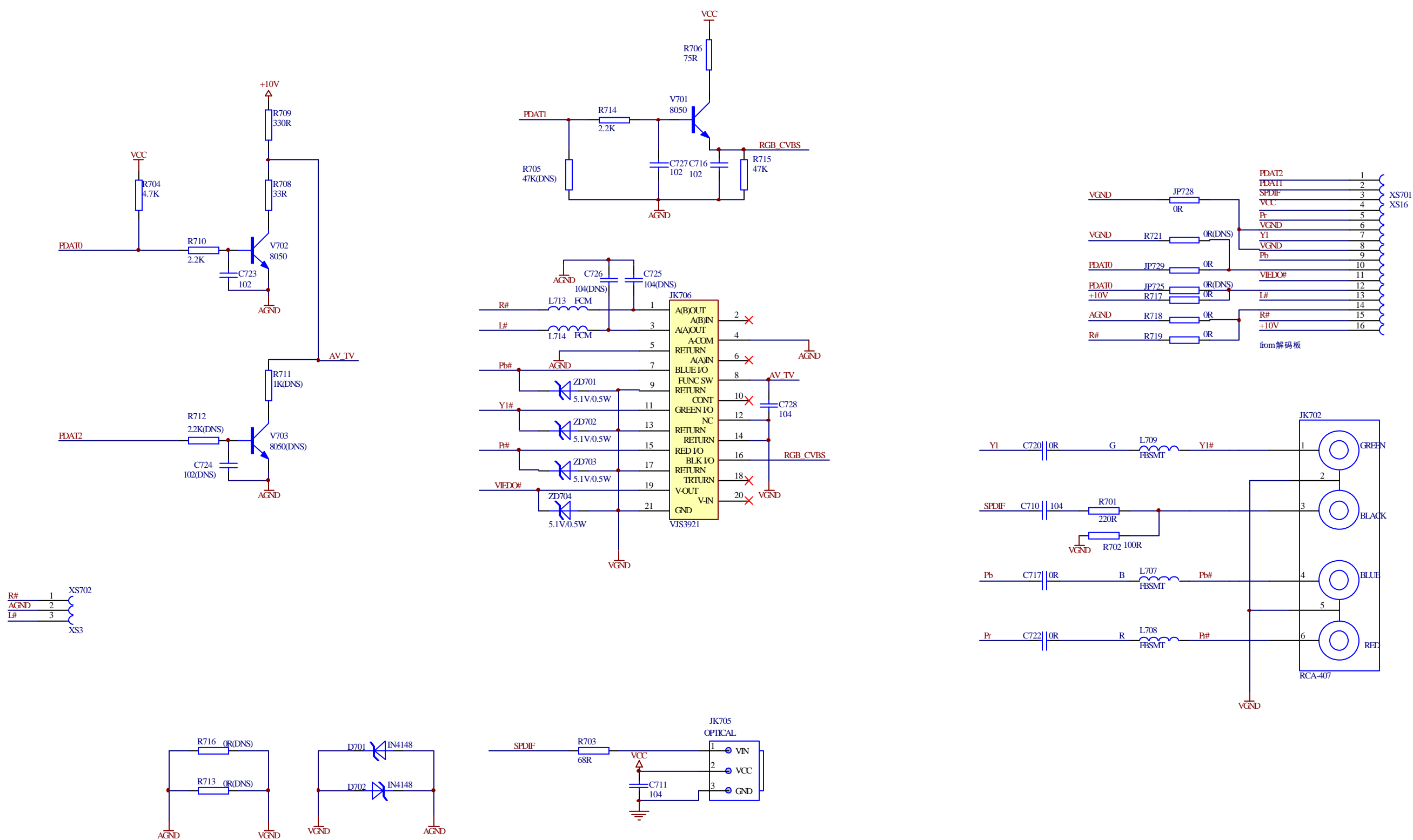


5.2.2 KEY SCAN Board

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Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DV717SI (RU) -2 SILVER[1389HD]	AV BOARD	5448550	
0090001	SMD RESISTOR	1/16W 00±5% 0603	C717,C720,C722,R717,R713,R716,R718
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R702
0700007	SMD DIODE	1N4148	D701,D702
0700001	SMD DIODE	LS4148	D701,D702
0700002	SMD DIODE	LL4148	D701,D702
0090238	SMD RESISTOR	1/16W 68O±5% 0603	R703
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C710,C728
0310543	SMD CAPACITOR	50V 104±10% X7R 0603	C710,C728
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C711
0090008	SMD RESISTOR	1/16W 220O±5% 0603	R701
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L707,L708,L709
1090045	ELECTRO-OPTIC TRANSFORMER	TX179ATW	JK705
1090024	ELECTRO-OPTIC TRANSFORMER	TX179AT	JK705
1910078	TERMINAL SOCKET	AV4-8.4-6G-3	JK702
2122457	FLAT CABLE	14-15P110 2.0 T2 TOGETHER DIRECTION,WITH NEEDLE,14 CORD	XS701
1940026	SOCKET	3P 2.0mm	XS702
2100010	LEAD	F 0.6 SHAPED 5mm	JP723~JP724,JP726,JP727,JP712,JP719 ,JP728,JP729,JP721,JP722
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP718,JP720,JP704
2100004	LEAD	F 0.6 SHAPED 10mm	JP709
2100006	LEAD	F 0.6 SHAPED 12.5mm	JP702
0780050	TRIODE	S8050D	V701,V702
0390057	MAGNETIC BEADS INDUCTOR	RH354708	L713,L714
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	ZD701,ZD702,ZD703,ZD704
0000273	CARBON FILM RESISTOR	1/4W33O±5% SHAPED 10	R708
0000278	CARBON FILM RESISTOR	1/4W330O±5% SHAPED 10	R709
1860029	SCART SOCKET	SCART-01	JK706
0310598	SMD CAPACITOR	50V 102±20% X7R 0603	C716,C723,C727
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R715
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R704

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R710,R714
0090006	SMD RESISTOR	1/16W 75O±5% 0603	R706
1564337	PCB	7231-1-1	
DV717SI (RU) -2 SILVER[1389HD]			
DECODE BOARD:2DV985-2 1.3/Ver3.1			
0090324	SMD RESISTOR	1/16W 0O±5% 0402	R229,R318,R214,R213
0090445	SMD RESISTOR	1/16W 1O±5% 0402	R321
0090457	SMD RESISTOR	1/16W2.2O±5% 0402	R706
0090507	SMD RESISTOR	1/16W 4.7O±5% 0402	R301,R302,R303
0090330	SMD RESISTOR	1/16W 33O±5% 0402	R350,R234,R349,R265,R235~R237,R274,R275
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R222
0100019	SMD RESISTOR NETWORKS	1/16W 33O±5% 8P	RN201,RN202
0090336	SMD RESISTOR	1/16W75O±5% 0402	R224,R223,R246~R251
0090759	SMD RESISTOR	1/16W 150O±5% 0402	R287
0090350	SMD RESISTOR	1/16W330O±5% 0402	R227,R337,R340,R381,R2160,R2161
0090356	SMD RESISTOR	1/16W560O±5% 0402	R239
0090362	SMD RESISTOR	1/16W 1K±5% 0402	R232,R233,R286,R2103,R2104,R2135~R2146
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R208,R220
0090377	SMD RESISTOR	1/16W 4.7K±5% 0402	R2117~R2122
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R238,R240,R241,R242,R331
0090378	SMD RESISTOR	1/16W 5.1K±5% 0402	R326
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R219,R221,R314
0090385	SMD RESISTOR	1/16W 10K±5% 0402	R201,R285,R288,R297,R309,R311,R313,R324,R329,R330,R364,R2105~R2109,R2123~R2128
0090387	SMD RESISTOR	1/16W 12K±5% 0402	R323
0090389	SMD RESISTOR	1/16W 15K±5% 0402	R202,R211
0090391	SMD RESISTOR	1/16W 20K±5% 0402	R325
0090394	SMD RESISTOR	1/16W 27K±5% 0402	R203,R204
0090395	SMD RESISTOR	1/16W 30K±5% 0402	R2111~R2116
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R210
0090012	SMD RESISTOR	1/16W 560O±5% 0603	R207
0090408	SMD RESISTOR	1/16W 100K±5% 0402	R215,R281~R284,R308,R310,R2101,R2147~R2152

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090412	SMD RESISTOR	1/16W 150K±5% 0402	R319,R320
0090429	SMD RESISTOR	1/16W 680K±5% 0402	R317,R322
0090668	PRECISION SMD RESISTOR	1/16W 750K±1% 0402	R209
0390453	SMD MAGNETIC BEADS	GZ1005D221T 0402	R264
0310415	SMD CAPACITOR	50V 20P±5% NPO 0402	C223
0310418	SMD CAPACITOR	50V 27P±5% NPO 0402	C275,C276
0310424	SMD CAPACITOR	50V 47P±5% NPO 0402	C257~C259
0310432	SMD CAPACITOR	50V 101±5% NPO 0402	C255,C256,C283~C288,C2111~C2116
0310392	SMD CAPACITOR	50V 102±10% X7R 0402	C224,C309,C2135,C2117~C2122,C705,C706
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C216~C218,C230~C235,C244~C252,C272,C302~C306
0310726	SMD CAPACITOR	16V 104±10% X5R 0402	C207~C209,C211,C214,C225,C227~C229,C236,C253,C254,C261~C265,C279,C281,C301,C313,C314,C316,C333,C334,C338,C339,C345,C346,C2131,C2149,C2158,C2137~C2148,C2150~C2152
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C201~C205,C239,C240,C317~C322,C2130,C2132,C2133,C2134
0310493	SMD CAPACITOR	50V 121 ±5% NPO 0402	C295,C340,C344,C290,C292,C294
0310201	SMD CAPACITOR	50V 153±10% X7R 0603	C238
0310454	SMD CAPACITOR	16V 153±10% X7R 0402	C210,C268,C310,C311
0310394	SMD CAPACITOR	50V 222±10% X7R 0402	C307,C308
0310068	SMD CAPACITOR	50V 222±10% X7R 0603	C237
0310570	SMD CAPACITOR	16V 333 ±10% X7R 0402	C226
0310482	SMD CAPACITOR	16V 473 ±10% X7R 0402	C221,C222
0310362	SMD CAPACITOR	16V474 +80%-20% Y5V 0603	C220
0310795	SMD CAPACITOR	16V 391±5% NPO 0402	C219
0310794	SMD CAPACITOR	16V 331±5% NPO 0402	C212,C213
0390452	SMD MAGNETIC BEADS	PZ3216D121	L212
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L202,L206,L208,L209,L218~L224,L307,L308,L311,L316
0390444	SMD MAGNETIC BEADS	PZ2012U121	L210,L211,L235,L315
0390385	SMD INDUCTOR	22uH±10% 2012	L204
0390355	SMD INDUCTOR	4.7UH±10% 1608	L203,L309,L312
0390096	SMD INDUCTOR	1.8UH±10% 1608	L225~L227,L231,L229,L233
0700113	SMD VOLTAGE REGULATOR DIODE	9.1V±5% 1/2W	D217
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	D205~D208,D218,D220~D222

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0700056	SMD DOUBLE DIODE	MMBD4148SE SOT-23	D209~D214
0700007	SMD DIODE	1N4148	D201,D203,D204,D215,D216
0780115	SMD TRIODE	2SB1132	Q301,Q302
0780193	SMD TRIODE	2SK3018	Q303,Q304
0780040	SMD TRIODE	3904(100-300) SOT-23	Q305
0780198	SMD TRIODE	2SA1015	Q211,Q213,Q214
0780197	SMD TRIODE	C1815	Q201,Q205~Q210,Q212
07803199	TRIODE	SS8550 TO-92 BELT	Q306,Q307,Q308,Q309
05700039	DIODE	1N4001 BELT	D301,D302
02607829	CD	CD11C 10V220U±20%6×12 C5 BELT	TC204,TC209,TC301,TC304,TC305
02601889	CD	CD11 16V100U±20%6×12 C5 BELT	TC222,TC223
02607819	CD	CD11C 10V100U±20%5×11 C2.5 BELT	TC203,TC207,TC218,TC308,TC309,TC235,TC238
02607809	CD	CD11C 10V47U±20%4×7 C2.5 BELT	TC208,TC219,TC302,TC303
02607799	CD	CD11C 16V10U±20%4×7 C2.5 BELT	TC201,TC202,TC205,TC206,TC215,TC240~TC252
0881742	IC	F4558 SOP	U209,U210,U211
0881947	IC	A21SC SOP	U202
0882353	IC	CS5340 TSSOP	U203
08828028	IC	AM5888S L/F HSOP\$	U302
0882644	IC	MT1389FE/H(HD) QFP	U201
0881415	IC	HY57V641620HGT-7 TSOP	U208
0960020	CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR	27.00MHz 49-S	X201
1940064	SOCKET	14P 2.0mm	XS204
1940023	SOCKET	7P 2.0mm	XS201
1940005	SOCKET	6P 2.0mm	XS307
1940024	SOCKET	5P 2.0mm	XS306,XS302
1940094	CABLE SOCKET	24P 0.5mm SMD SUBMIT MEET WITH CLASP	XS301
1940022	SOCKET	4P 2.0mm	XS203
1910129	TERMINAL SOCKET	SA-001-012 BLACK IRON PIECE,SCREEN-SHIELDED	JK703
1910079	TERMINAL SOCKET	AV8-8.4-6G-3	JK701
1633213	PCB	2DV985-2	
DV717SI (RU) -2 SILVER[1389HD]			

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
MAIN PANEL 5448677			
0000163	CARBON FILM RESISTOR	1/4W100±5%	R418
0260201	CD	CD11C 16V100U±20%6×7 2.5	TC402,TC407
0260254	CD	CD11C 10V100U±20%6×5 2.5	TC402,TC407
1200515	DISPLAY SCREEN	VFD16-0604	VFD401
5233201	SOFT SPONGE SPACER	12×12×8 DOUBLE-FACED,HARD	VFD屏与PCB粘接
2360016	IR SENSOR	HS0038B3V	U403
2360019	IR SENSOR	AT138B	U403
5233065	SOFT SPONGE SPACER	8×8×10 DOUBLE-FACED,HARD	
0620076	RADIATION DIODE	3B3HC COLORLESS WITH BLUE	LED402
3028527	LED BRACKET (RIGHT)	DV973	固定LED402用
0620002	RADIATION DIODE	F 3 RED	LED401
1340064	LIGHT TOUCH RESTORE SWITCH	KFC-A06-2WB L3.8	K401 ~ K404
1940022	SOCKET	4P 2.0mm	XS403
2122066	FLAT CABLE	5P320 2.0 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION 26#	XS401
2122272	FLAT CABLE	7-5P160 2.0 2 PIN,WITH NEEDLE,TOGETHER DIRECTION 5 CORD	XS402
DV717SI (RU) -2 SILVER[1389HD]			
OK BOARD 5448678			
0090003	SMD RESISTOR	1/16W 100±5% 0603	R621,R622
0090009	SMD RESISTOR	1/16W 330±5% 0603	R601
0090012	SMD RESISTOR	1/16W 560±5% 0603	R604
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R608,R625,R626
0090018	SMD RESISTOR	1/16W 3.3K±5% 0603	R630
0090224	SMD RESISTOR	1/16W 3.9K±5% 0603	R631, R632
0090184	SMD RESISTOR	1/16W 4.3K±5% 0603	R633, R634
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R602, R613, R623
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R606,R610,R635,R636
0090026	SMD RESISTOR	1/16W 22K±5% 0603	R603
0090030	SMD RESISTOR	1/16W 56K±5% 0603	R627,R628
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R617
0310047	SMD CAPACITOR	50V 101±5% NPO 0603	C606, C607, C616, C617

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0310066	SMD CAPACITOR	50V 102±10% X7R 0603	C608
0310072	SMD CAPACITOR	50V 103±10% X7R 0603	C603
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C601,C602,C604,C605,C623
0310222	SMD CAPACITOR	25V 104±20% X7R 0603	C601,C602,C604,C605,C623
0310543	SMD CAPACITOR	50V 104±10% X7R 0603	C601,C602,C604,C605,C623
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C609,C611,C612
0000339	CARBON FILM RESISTOR	1/6W3.3K±5% SHAPED 7.5	R629
0000134	CARBON FILM RESISTOR	1/6W5.1K±5% SHAPED 7.5	R611
0260094	CD	CD110 16V47U±20%5×11 2	TC614 ~ TC618
0260025	CD	CD11 16V47U±20%5×11 2	TC614 ~ TC618
0260200	CD	CD11C 16V47U±20%5×7 2	TC614 ~ TC618
0260327	CD	GZ16V100U±20%6×12 2.5	TC619, TC620
0260027	CD	CD11 16V100U±20%6×12 2.5	TC619, TC620
0260096	CD	CD110 16V100U±20%6×12 2.5	TC619, TC620
0260175	CD	CD11C 16V100U+20%-15%6×7 2.5	TC619, TC620
0260201	CD	CD11C 16V100U±20%6×7 2.5	TC619, TC620
0260021	CD	CD11 16V22U±20%5×11 2	TC605
0260037	CD	CD11 25V22U±20%5×11 2	TC605
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L601
0260237	CD	CD11 10V1000U±20%8×14 3.5	TC601
0260352	CD	GS 10V1000U±20%8×14 3.5	TC601
0700020	SMD VOLTAGE REGULATOR DIODE	6.2V±5% 1/2W	ZD601
0780085	SMD TRIODE	8050D	Q601,Q602
0880124	IC	NJM4558D DIP	U601
0880308	IC	KA4558 DIP	U601
0881537	IC	TDA1308 SOP	U603
1980018	MICROPHONE SOCKET	CK3-6.35-24	MIC601
1940024	SOCKET	5P 2.0mm	XS601
2150295	FLAT CABLE	3P300 2.0 T2 1P SHIELD,WITH NEEDLE,REVERSE 28# CORD	XS603
1564176	PCB	6717-0	
2100010	LEAD	F 0.6 SHAPED 5mm	JP601 ~ JP609
1980046	EARPHONE SOCKET	ST-301-030-100	JK601

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
3870115	GROUND CHIP OF POWER BOARD	AB903	G601, G602
DV717SI (RU) -2 SILVER[1389HD]			
POWER BOARD		5448676	
00002159	CARBON FILM RESISTOR	1/4W9.1K±5% BELT	R512
00001959	CARBON FILM RESISTOR	1/4W1K±5% BELT	R507
00001859	CARBON FILM RESISTOR	1/4W330O±5% BELT	R506
00001729	CARBON FILM RESISTOR	1/4W75O±5% BELT	R505
00700169	HIGH PRESSURE RESISTOR	@1/2W680K±5% VDE BELT	R501
0010159	METAL OXIDE FILM RESISTOR	2W39K±5%SHAPED FLAT 15×7	R503
00100159	METAL FILM RESISTOR	1/4W10K±1% BELT	R508,R509
05700059	DIODE	1N4007 BELT	D501~D504
05800069	VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W BELT	ZD501
0680046	SCHOTTKY DIODE	SR560 DO-27 SHAPED R 17.5×8	D510
05700149	DIODE	HER107 BELT	D505
05700139	DIODE	HER105 BELT	D506,D508,D511~D513
0260809	CD	CD288 16V2200U±20%13×20 5	TC505
0260694	CD	CD288 10V1000U±20% 8×16 C5	TC506
0260557	CD	CD11T 16V100u±20%6×12 2.5	TC504
0260559	CD	CD11T 50V47u±20%6×12 2.5	TC502 , TC508
0260341	CD	ZT 400V22μ±20%f 16×20 7.5	TC501
02607989	CD	CD11T 16V470U±20%8×12 C5 BLET	TC509,TC503
0210207	TERYLENE CAPACITOR	@275V 104±20% 15mm VDE	BC501
02002249	PORCELAIN CAPACITOR	1000V 103 +80%-20% 7.5mm BLET	C502
02001389	PORCELAIN CAPACITOR	50V 104±20% 5mm BELT	C505,C507,C508,C510,C515
02003809	PORCELAIN CAPACITOR	100V 152±10%5MM BLET	C512
02001369	PORCELAIN CAPACITOR	50V 473±20% 5mm BELT	C506
0880863	IC	HA17431VP TO-92	U503
0881933	IC	VIPER22A DIP8	U501
0460623	SWITCH POWER TRANSFORMER	@BCK-19-0348 SJ	T501
1000062	POWER GRID FILTER	@JLB1153 33MH + -0% SJ	L501
1080032	PHOTOELECTRIC COUPLER	@HS817 VDE	U502
0200359	CERAMIC CAPACITOR	@250V 221±10% 10mm VDE	BC503,BC504

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0410011	CHOKE COIL	VERTICAL 10UH 2A 5mm	L507
2100004	LEAD	F 0.6 SHAPED 10mm	JP501 , JP504
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP502 , JP503
1940045	SOCKET	2P 8.0mm 2#	BCN501
1940022	SOCKET	4P 2.0mm	CN501
1940024	SOCKET	5P 2.0mm	CN502
2300049	FUSE	@T1.6AL 250V 3.6×10 VDE	F501
3870115	GROUND CHIP OF POWER BOARD	AB903	G501~G504
1564554	PCB	@5DV985-4 UL	
DV717SI (RU) -2 SILVER[1389HD]			
REMOTE CONTROL		5471656	
0310048	SMD CAPACITOR	50V 151±5% NPO 0603	C802,C803
0630009	EMISSION PIPE	TSAL4400	LED801
0700007	SMD DIODE	1N4148	D801~D803
0700001	SMD DIODE	LS4148	D801~D803
0700002	SMD DIODE	LL4148	D801~D803
0780130	SMD TRIODE	STC3265	Q801
0880220	IC	PT2222 SOP	U801
0882379	IC	S0102B SOP	U801
0970003	CERAMIC RESONATOR	455E	X801
4000038	SELF-TAPPING SCREW	PB 2.3×6 COLOR ZINC	
0090272	SMD RESISTOR	1/16W 10±5% 0603	R801
1564324	PCB	8516SI-3	
3031789	SURFACE CASING OF REMOTE CONTROL	RC026-01R BLACK	
3041399	BOTTOM CASING OF REMOTE CONTROL	RC026 BLACK 2#	
3051319	BATTERY CASE DOOR OF REMOTE CONTROL	RC026 BLACK 2#	
3051273	GLASS OF REMOTE CONTROLLER	RC026 MING PURPLE	
3850124	ANODE SPRING	RC026	
3850125	CATHODE SPRING	RC026	
3850126	ANODE/CATHODE SPRING	RC026	
4631052	CONDUCT GLUE OF REMOTE CONTROL	RC026-01R 4#	
5070070	GLUE BAG	85×250	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DV717SI (RU) -2 SILVER[1389HD]			
SUBSIDIARY PANEL		5445111	
1563444	PCB	9973-2	
2121417	FLAT CABLE	4P 230 2.0 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION	XS901
1340064	LIGHT TOUCH RESTORE SWITCH	KFC-A06-2WB L3.8	K901
0200307	PORCELAIN CAPACITOR	50V 101±10% SHAPED 5mm	C901,C902
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP901~JP902
0620076	RADIATION DIODE	3B3HC COLORLESS WITH BLUE	LED901
3028526	LED BRACKET (LEFT)	DV973	LED90
DV717SI (RU) -2 SILVER[1389HD]			
PROGRAM FLASH ROMDV717SIRU2-0A(16M)		0911764	
0881650	IC	29LV160BE-70PFTN TSOP	U214
0881651	IC	M29W160EB 70N6 TSOP	U214

DV723SI

Service manual

Decode board, power board and AV output board circuit of DV723SI is the same with that of DV717SI-2 and refer to DV717SI-2 relevant circuit explanation for details. The difference of DV723SI and DV717SI-2 is that main panel display screen adopts LED screen, control IC is Pt6961 and USB jack is added otherwise. The differences of DV723SI and DV717SI-2 are introduced as follows:

7.1.1 Panel control circuit

1. Panel control circuit block diagram is shown in the figure 7.1.1.1:

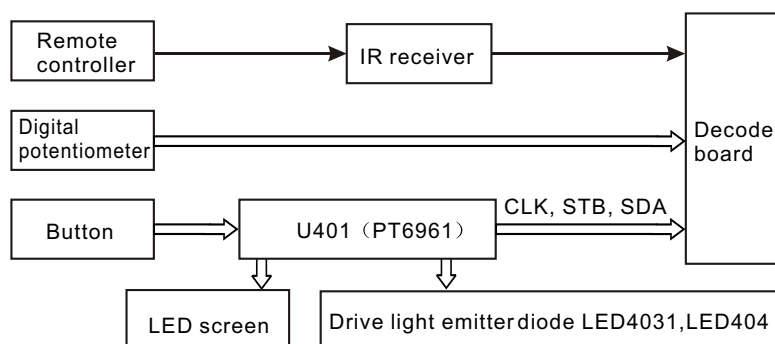


Figure 7.1.1.1 Panel control circuit block diagram

2. Working principle:

Panel is mainly composed of LED screen, drive chip Pt6961, IR receiver of remote controller, buttons and indicator light.

LED screen is the display module composed of LED light emission character segment, GRID1~GRID7 is segment control, SEG1~SEG9 is bit control.

Function of U401 (PT6312A) is to process data signals sent from decode board to drive display screen to display the relevant state, and scan panel buttons matrix at the same time, after processing button information, send to CPU in the means of digital signal to control the player to make the relevant action.

Pin 2 of remote control IR receiver is 5V power suppl pin, pin 1 is grounded, pin 3 is output pin, receiver processes button information of remote controller and then outputs from pin 3 to decode board directly.

7.1.2 MIC circuit

1. MIC circuit block diagram is shown in the figure 7.1.2.1:

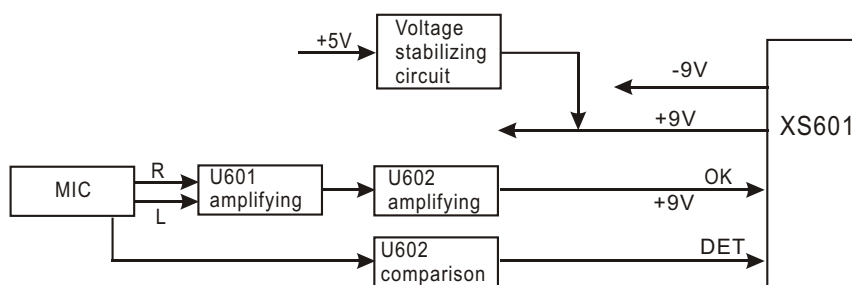


Figure 7.1.2.1 MIC circuit block diagram

2. Working principle: after microphone is inserted into MIC left, DET signals change from low level to high level to make mute circuit of decode part off, no matter whether disc reading is available, audio signals may output. If this signal has trouble, microphone will have no sound when playback stops. After being filtered, signals inputted by microphone outputs to pin 5 of U601 and then outputs from pin 7 of U601 after discharge. Through the second amplifying, outputted by pin 1 of U602 to send to decode board directly for Karaoke signal processing and output with audio signals to realize Karaoke function.

7.1.3 Headphone circuit

1. Headphone circuit block diagram is shown in the figure 7.1.3.1:



Figure 7.1.3.1 Headphone circuit block diagram

2. Working principle: H_L/H_R signal of audio output end transmits to MIC board headphone amplifying circuit through Xs603, headphone amplifying circuit is mainly composed of U603 (TDA1308). Function of main pin of TDA1308: pin 1, 7 are output pin, pin 6, 2 are input pin. Audio signals, after being amplified, output to headphone socket (Jk601) directly.

7.2.1 Servicing cases

[Example 1] Symptom: not read DVD disc

Description: when playing DVD disc, disc reading is not available

Analysis and troubleshooting: firstly check focus, trace, feed and main axis and they are all normal, light emission head has light emitting; check voltage of emitter electrode of Q301 and it is 3.10V, which is normal, voltage of collector electrode is 2.44V, which is also normal, so we doubt that loader has trouble, after changing loader, trouble is removed.

[Example 2] Symptom: display of screen is dark

Description: when power on, part of screen has dark display and part has bright display

Analysis and troubleshooting: check power supply of panel and each voltage is normal, test voltage of two ends of screen and they are 7V and 19V, which are normal, so we judge that screen has trouble inside, after changing display screen, trouble is removed.

7.2.2 Troubleshooting flow chart

1. Troubleshooting process for “Power not on” is shown in the figure 7.2.2.1:

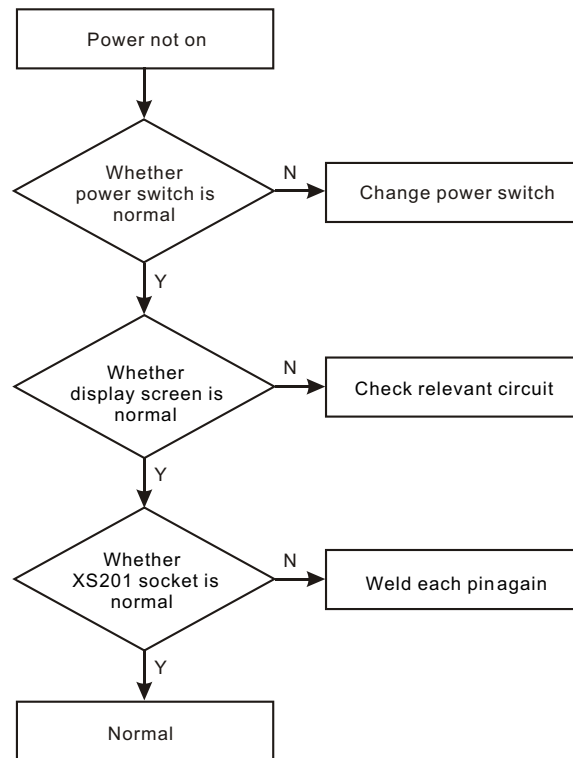


Figure 7.2.2.1 Troubleshooting flow chart for “Power not on”

2. Troubleshooting process for "Not read disc" is shown in the figure 7.2.2.2:

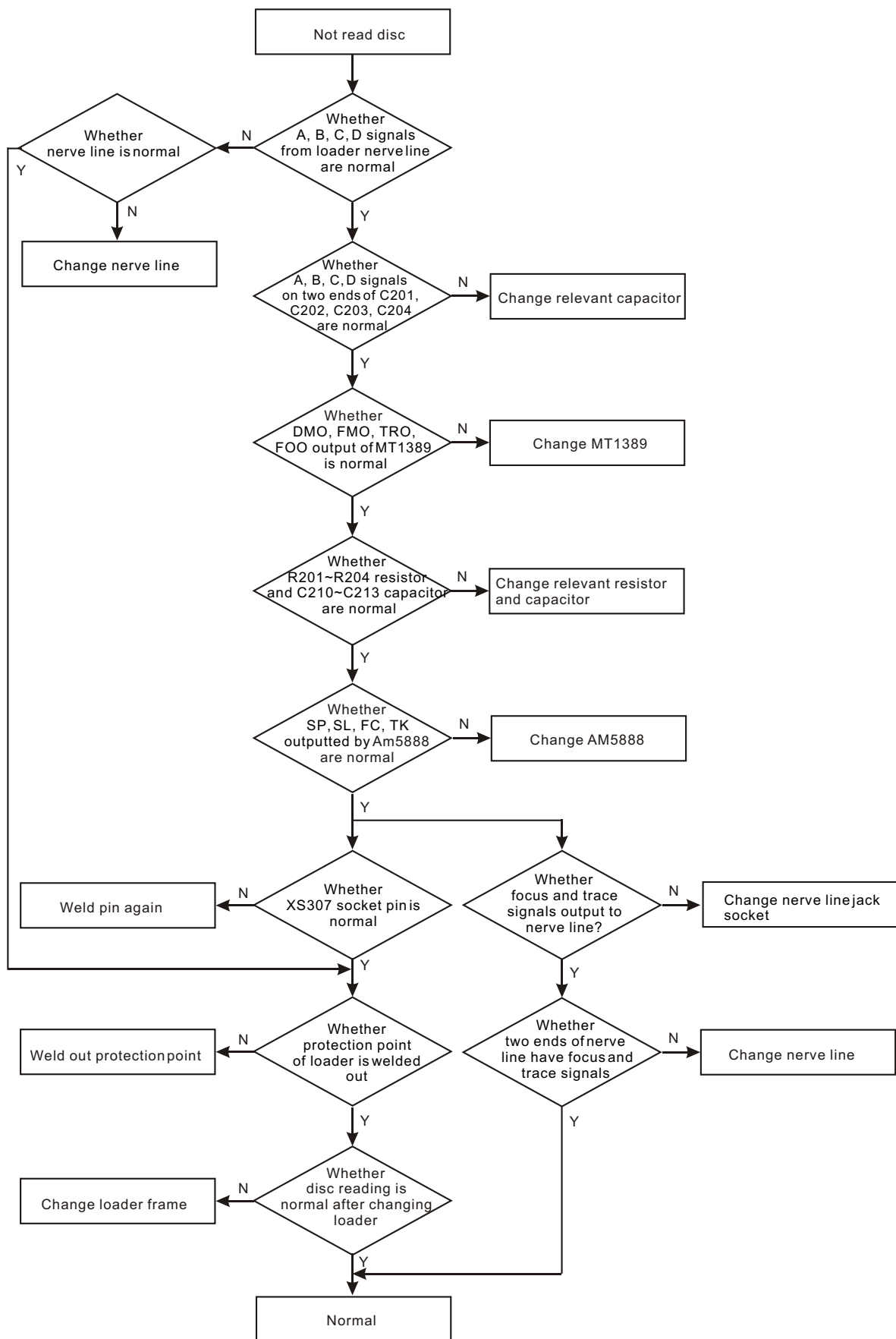
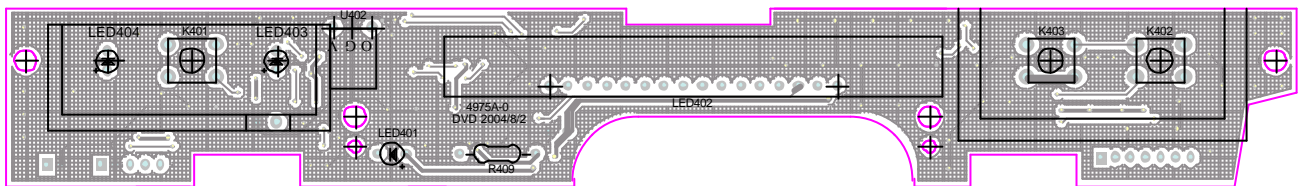


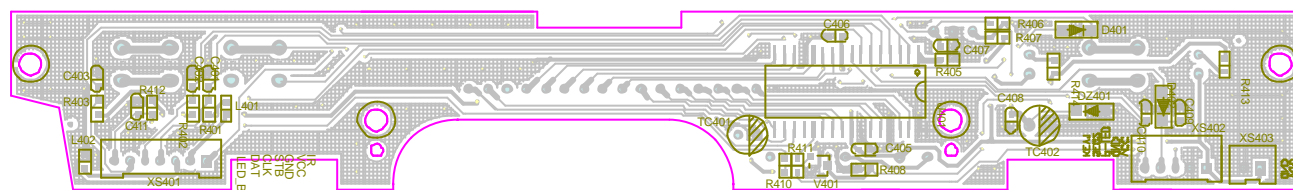
Figure 7.2.2.2 Troubleshooting process for "Not read disc"

7.3.1 PCB board

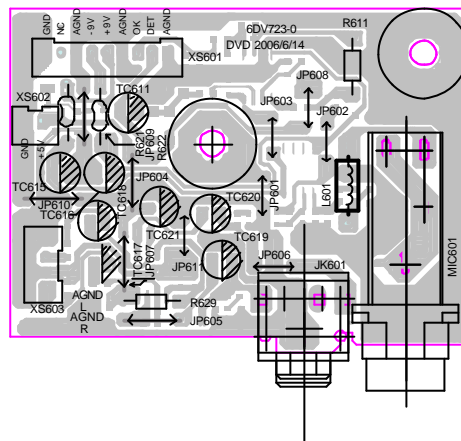
1. Surface layer of KEY SCAN Board



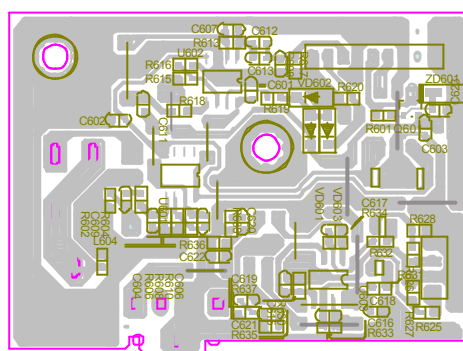
2. Bottom layer of KEY SCAN Board



3. Surface layer of MIC Board

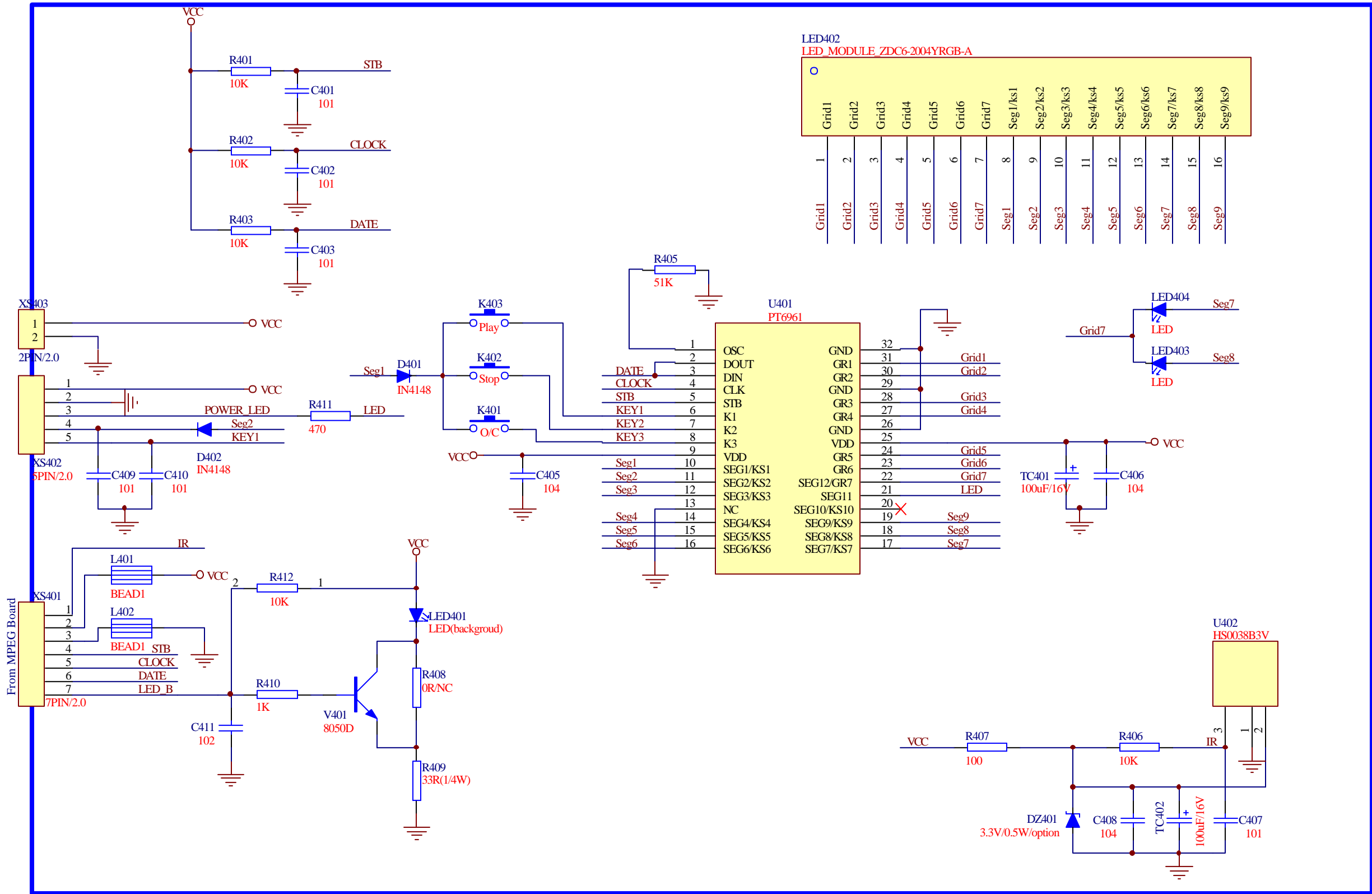


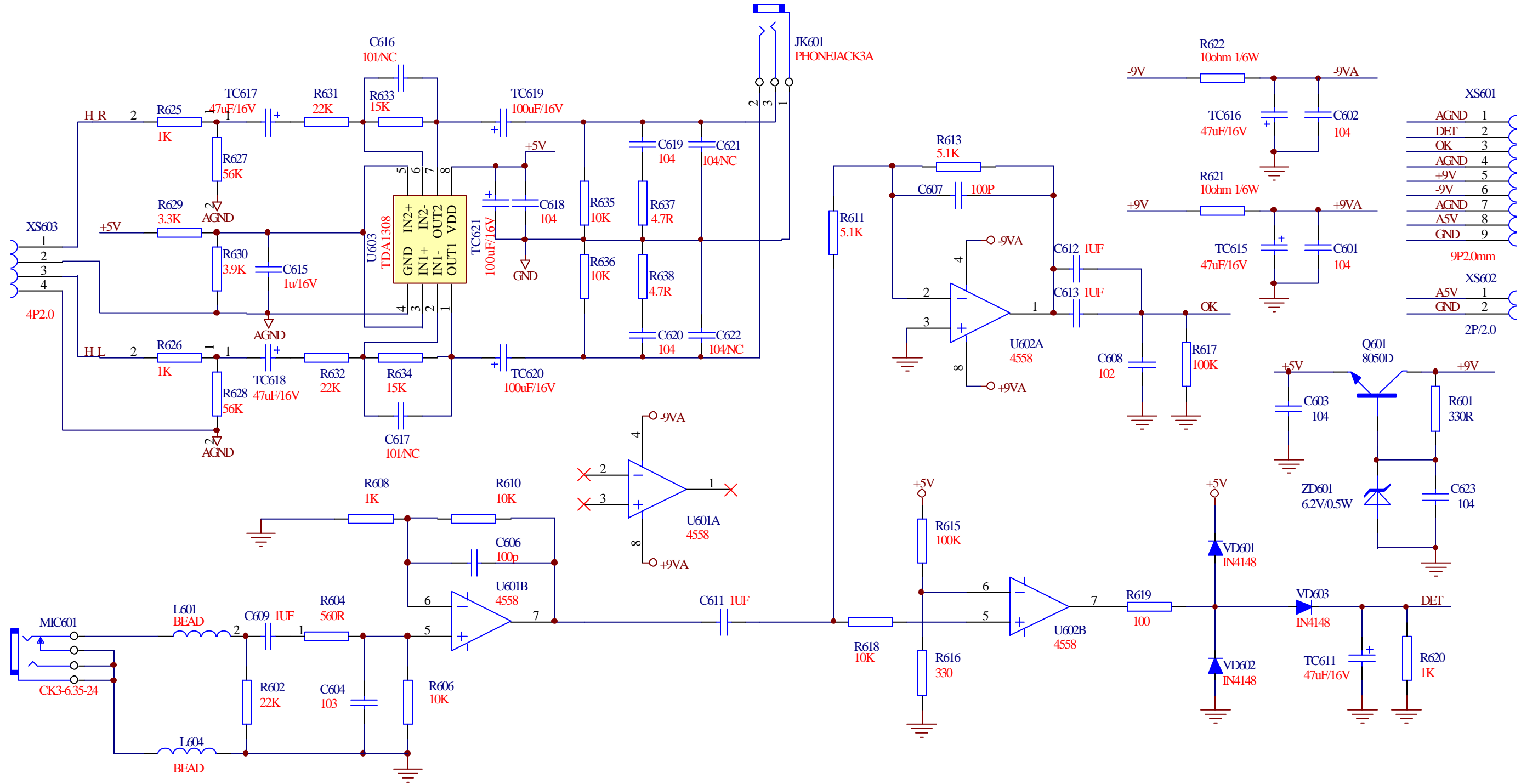
4. Bottom layer of MIC Board



7.3.2 circuit diagram

1. KEY SCAN Board





DV721SI-2

service manual

Decode board, power board and AV output board circuit of DV721SI-2 is the same with that of and refer to DV717SI-2 relevant circuit explanation for details. The difference of DV721SI-2 and DV717SI-2 is that main panel screen adopts LED screen and control IC is PT6554. Now we will introduce the differences between DV721SI-2 and DV717SI-2.

8.1.1 Panel control circuit

1. Panel circuit block diagram is shown in the figure 8.1.1.1;

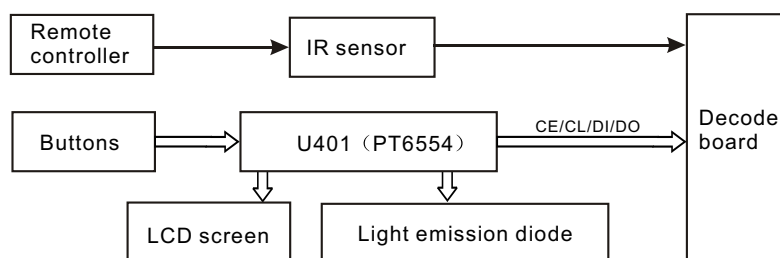


Figure 8.1.1.1 Panel control circuit block diagram

2. Working principle:

Panel components are divided into main panel and subsidiary panel. Main panel is mainly composed of LCD screen display, drive chip PT6554 and indicator light and subsidiary panel is mainly composed of power button, power indicator light and remote control IR receiver.

LCD screen is a liquid crystal display screen. Because liquid crystal screen is passive light emission display, back light board is required to display. S1—S16 are 16 data lines to display information of PT6554 on screen.

The function of U401 (PT6554) is to process data signals sent from decode board to drive display screen to display the relevant status, and scan panel buttons matrix at the same time, after processing buttons information, send it to CPU in the means of digital signals to control the player to make the relevant action.

Pin 2 of remote control IR receiver HS0038B3V is 5V power supply pin, pin 3 is grounded, pin 1 is output pin, remote control receiver processes buttons information of remote controller and outputs from pin 1 to decode board directly.

8.1.2 MIC circuit

1. MIC circuit block diagram is shown in the figure 8.1.2.1:

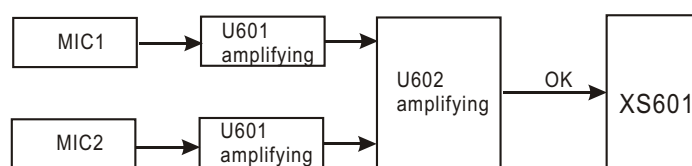


Figure 8.1.2.1 MIC circuit block diagram

2. Working principle

MIC part working principle: after microphone is inserted into MIC left, DET signals change from low level to high level to make mute circuit of decode art off. No matter disc reading is available, audio signals may be outputted. If this signals has trouble, microphone will have no sound when playback is stopped. After being filtered, signals inputted by microphone output to U601 and signals after discharging output from U601, through the second amplifying, outputted by U602 to decode board directly for Karaoke signals processing and output together with audio signals to realize the function of Karaoke.

8.2.1 Servicing instances

[Example 1] Symptom: power not on

Description: +5V, +9V, -9V, +3.3V have no output

Analysis and troubleshooting: check power board and find that each channel voltage has no output. Check and find that 220V voltage input is normal and bridge rectification circuit has no voltage output. Use multimeter to test fuse pipe and find that it has open circuit; change fuse pipe and trouble is not removed. Test anode of Tc501 and there is still no voltage output and fuse pipe has been burnt down. Check the 4 diodes of bridge rectification circuit and they are all normal, Tc501 has no liquid leakage and is stricken through; test pin 1 and pin 8 of U501 (switch IC) and they are short-circuited, this IC has been stricken through, after changing this IC, trouble is removed.

[Example 2] Symptom: no MIC

Description: after inserting microphone and speaking towards MIC, there is no sound output, but disc sound output is normal.

Analysis and troubleshooting: after power on and inserting microphone, use oscillograph to test OK signal of pin 2 of Xs302 and find that this pin has no OK signal; when checking pin 7 output of MIC board U601, OK signal output is abnormal; when inserting and unplugging microphone, check DET detect signal and voltage is kept in 3.3V, after changing MIC holder and trouble is removed.

[Example 3] Symptom: noise appears when power off

Description: at the moment of power off, audio output had noise and TV speaker gives a bump sound.

Analysis and troubleshooting: when this kind of problem appears, trouble always occurs in power-off noise removing circuit. Firstly, test MUTE-! Voltage of C -knot of Q214 at the moment of power off and find that voltage of this point changes gradually from -7.8V to 0.5V; use multimeter to test circuit elements around Q214 and find that D204 1N4148 diode has been stricken through, after changing it, trouble is removed.

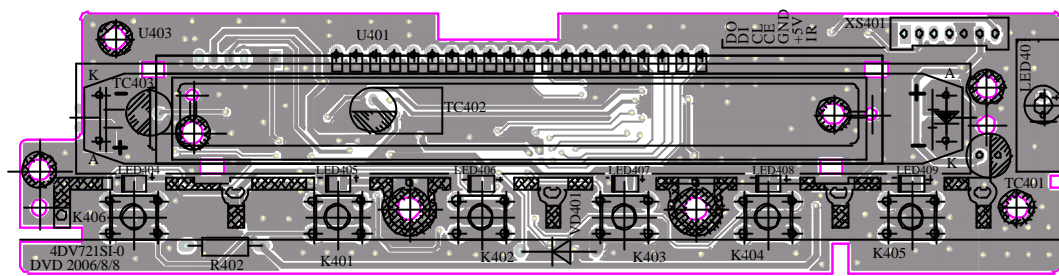
[Example 4] Symptom: not read DVD disc

Description: all other discs can be read, except for DVD disc

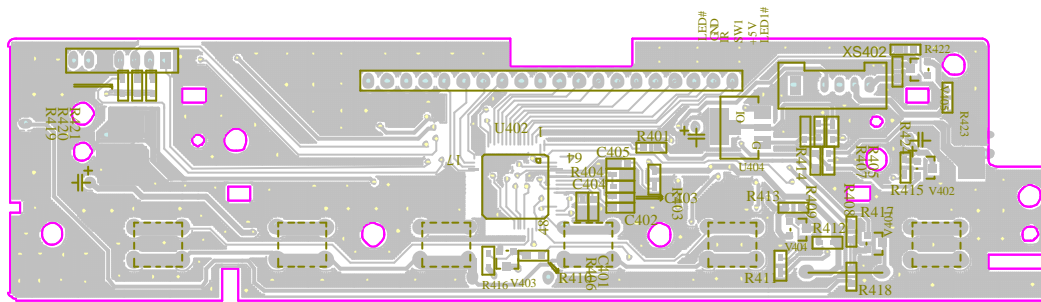
Analysis and troubleshooting: check laser head, focus, feed, main axis and trace and they are all normal, but there is no light emission. Check voltage of emitter electrode of Q301 and it is 3.3V, which is normal, voltage of collector electrode is 2.2V, which is also normal; test inductor L312 between collector electrode and pin 2 of Xs301 and find that inductor has open circuit; after changing inductor, trouble is removed.

8.3.1 PCB board

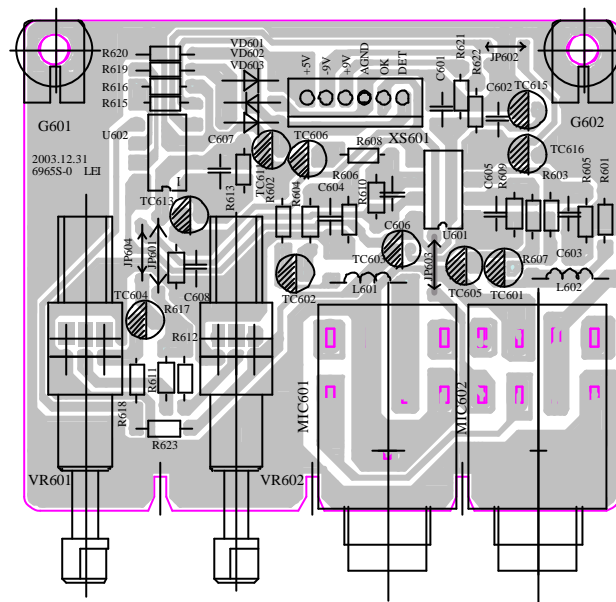
1. Surface layer of KEY SCAN Board



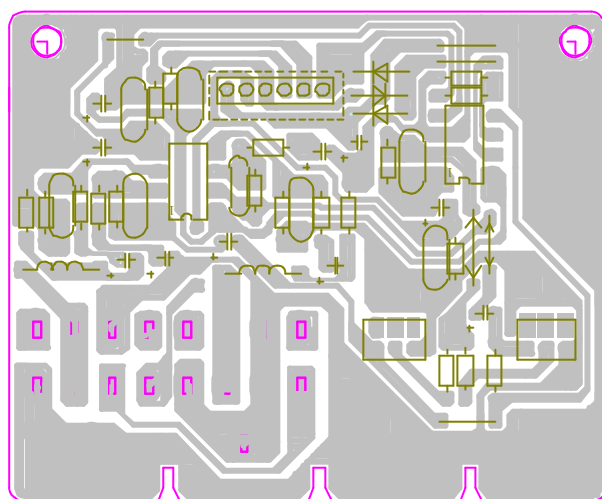
2. Bottom layer of KEY SCAN Board



3. Surface layer of MIC Board



4. Bottom layer of MIC Board



8.3.2 circuit diagram

1. KEY SCAN Board

